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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. Fry, R. M. (1933). **Anaerobic Methods for the Identification of Haemolytic Streptococci.**—*J. Path. & Bact.* **37.** 337-340. 1 table. [4 refs.]

II. Gordon, J. (1933). **A Note on the Influence of Sodium Lactate in the Production of Green Discoloration (H_2O_2 Formation) by Streptococci.**—*Ibid.* 501-502. [4 refs.]

III. Weld, Julia T. (1934). **The Toxic Properties of Serum Extracts of Hemolytic Streptococci.**—*J. Exp. Med.* **59.** 83-95. 5 tables. [16 refs.]

I. In eleven cases (mostly of puerperal infection) observed over a period of three years, streptococci were obtained which, when grown on the surface of blood agar in air, were green, but which, when grown anaerobically (or under partial anaerobiosis), were β haemolytic. All produced haemolysin in fluid media. In six cases β haemolytic streptococci were obtained from another focus of disease in the same patient. In the case of two patients in which serological observations were made, the green (surface cultures) and β forms were serologically alike.

II. Certain strains of non-green forming streptococci, when grown on blood agar, become green formers when 0·2, 0·5 or 1 per cent. of sodium lactate is added to the medium. This change is associated with the production of H_2O_2 as shown by the blackening of a benzidine blood agar lactate plate.

III. By treating haemolytic streptococci with inactivated serum, toxic extracts were obtained which were leucocidic and extremely haemolytic and which, when injected intravenously in relatively small amounts into mice, caused marked haemoglobinuria, anaemia and death. There was evidence that the anaemia was not the only cause of death. Incompleted work indicated that the haemotoxin and the lethal poisons are not antigenic.—A. W. Stableforth.

Seelemann, M., & Hadenfeldt, A. (1933). Ergebnisse mehrjähriger Sanierungsmässnahmen in galtverseuchten Milchviehbeständen der Provinz Schleswig-Holstein. [**Many Years Experience with Hygienic Measures against Streptococcic Mastitis in Schleswig-Holstein**].—*Milchwtsch. Forsch.* **16.** 101-147. 2 figs., 28 tables. [9 refs.]

Fairly detailed summaries are given of the results of attempts to control streptococcic mastitis in 11 herds in Schleswig-Holstein by separation of the infected and uninfected cows, or by a combination of this procedure with treatment of the infected animals by means of " entozon " infusions *via* the teat canal.

The experiments lasted from two to four years. Within this period streptococcic mastitis was in no case eradicated by separation alone and in only one case was this

result achieved by the combination of separation and treatment. New infections continued to occur in all herds, particularly during the first year or so. The number of these generally fell, however, with the result that, as the older infected animals were removed, the percentage of infections gradually dropped. [The actual number of cases removed is not always given].

The results may best be given in the form of tables :—

CONTROL BY SEPARATION OF INFECTED FROM NON-INFECTED COWS.

Herd.	Size.	Original percentage of infected cows.	Final percentage of infected cows.	Period Years.
S.	177	42	29	2
Ko.	180	54	23	4
D.	65	60	47	2
J.	50	20	10	2
L.	138	43	30	3

AS ABOVE BUT WITH " ENTOZON " TREATMENT OF INFECTED ANIMALS.

Herd.	Size.	Original percentage of infected cows.	Final percentage of infected cows.	Period Years.
R.	134	70	8·6	4
	(92 treated in last 2 years ; 70 free for 1 to 18 months).			
DO.	88	42	5·4	2
	(59 treated in last year ; 50 free for 1 to 17 months).			
H.	81	52	10	2
	(45 treated in last year ; 41 free for 1 to 13 months).			
G.	80	13	5	2
	(22 treated in last year ; 18 free for 1 to 9 months).			
F.	22	100	0	5
	(7 treated in last year ; 7 free for 6 months).			
Q.	200	45	7	2
	(108 treated in last year ; 83 free for 1 to 16 months).			

Mixed samples from the four quarters were examined several times a year. The tests used for the detection of infected animals were, first, the combined test for alkalinity and catalase, secondly, a microscopic examination, and thirdly, in doubtful cases and microscopically positive cases, a surface culture test to determine whether the streptococci were typical or atypical [this *Bull.* **3.** 393].

The degree of success obtainable is believed to depend largely upon the co-operation of the owner and his staff. A notable increase in milk yield accompanied the reduction of the proportion of infected animals and was marked in infected cows which were cured by " entozon " infusion.—A. W. STABLEFORTH.

I. PETERSEN, G. (1934). Lov af 26. Juni 1932 om Bekaempelse af Tuberkulose hos Kvaeg og Svin og dens Udførselsbestemmelser. [**The Law of June 1932 on the Control of Bovine and Porcine Tuberculosis (Denmark)**].—*Med. dansk. Dyrl.* **17.** 1-17. [*Verbatim* translation in *Bull. Off. internat. Epiz.* **7.** 1215-1218].

II. REGNER, G. (1934). Resultatet av statens åtgärder mot kreaturstuberkulosen vid utgången av år 1932. [**Results of the State Campaign against Animal Tuberculosis at the End of 1932 (Sweden)**].—*Svensk Vet.-tidskr.* **39.** 1-12. 6 tables. [1 ref.]

I. Makes a further evolution possible in the eradication of tuberculosis of domestic animals with the object of intensifying Bang's method of eradication. Farmers obtain free tuberculin tests and have to provide isolation facilities.

Veterinary surgeons are provided with free tuberculin on the understanding that they must supply information on the results obtained. The government are to appropriate Kr.100,000 annually for the expenses of the campaign. The state also provides support for the tuberculin testing of swine at pig-breeding centres and certificates are issued.

II. Describes the history of tuberculosis eradication in Sweden since its inception in 1897. In the following decade 245,672 animals were tuberculin tested in south and central Sweden and 31·3 per cent. reacted. Between 1908 and 1932, 370,000 animals were tested and 24·5 per cent. reacted.

—H. C. Bendixen (Copenhagen).

I. Glover, R. E. (1933). **The Preparation of a Synthetic Johnin.**—*Third Rep. Direct. Inst. Anim. Path. Univ. Cambridge. 1932-1933.* pp. 233-236. 2 tables. [1 ref.]

II. Sheather, A. L. (1933). **The Control of Johne's Disease.**—*Vet. Rec.* **13.** 1180-1183.

I. At the outset the author refers to the publication by Dunkin (1933) [this *Bull.* **4.** 372.] in which a method of obtaining an active johnin in Henley's synthetic medium with and without the use of *B.* [*Mycobact.*] *phlei* was described.

The encouraging results which had attended the production of a synthetic tuberculin by the use of a modification of Long's medium suggested to the author that an effort should be made to produce johnin on the same lines. The modified medium is described and also its method of preparation. The organism used failed to adapt itself to the medium at first but after the fourth passage the rate and luxuriance of growth increased rapidly. The method of preparing johnin is described in detail as well as the test of the final product on affected and normal animals. A comparison of the results obtained by the use of standard johnin and the synthetic product is given in a table.

Concentration of the final product is secured by salting-out with a saturated solution of ammonium sulphate, and in this the method adopted is different from that described by Dunkin, who concentrated it in the water-bath.

II. The subject is dealt with generally, stressing the more important points to be considered by the clinician. The view is expressed that probably not every animal which contracts the disease becomes clinically affected. The irregularity of *post-mortem* symptoms is pointed out and early diagnosis by allergic tests briefly touched upon.

In the course of the discussion which followed, such points as the longevity of the organism and the value of johnin and avian tuberculin as diagnostic agents were argued.—G. W. Dunkin.

Balozet, L., Cordier, Georgette, & Ménager, J. (1933). Le bacille pyogène de Grips agent d'enzootie de mastoïdites et d'abcès du cerveau, chez le Porc. [**Mastoiditis and Brain Abscesses in Swine caused by** *Corynebacterium pyogenes*].—*Bull. Acad. vét. France.* **6.** 352-355. 1 fig.

The authors describe a disease of swine in Morocco and Tunis characterized by loss of condition and the holding of the head to one side, combined with movement in a circle. The animals frequently fall and struggle, and eventually die after an illness of six or seven weeks.

Post-mortem examination constantly shows abscessation of the middle cerebellar peduncles originating from a mastoiditis, which in turn, apparently, becomes infected from the pharynx *via* the eustachian tube.—J. E.

KIRCHENBAUER, H. (1934). Die Stellung des Bact. influenzae suis im System der hämoglobinophilen Bakterien und sein Vorkommen bei Schwein, Schaf, und Rind. [**The Position of *Haemophilus influenzae suis* in the System of Haemoglobinophilic Bacteria and its Occurrence in Pigs, Sheep and Cattle**]. —*Zschr. Infektkr. Haust.* **45.** 273-293. 3 figs., 2 tables. [44 refs.]

Bacteria, which had the characters of the organism described by KOBE [this *Bull.* **3.** 471.] under the name *Bact.* [*Haemophilus*] *influenzae suis*, were isolated in very small numbers on heated blood agar plates from ten out of 90 healthy pigs ; in five cases from the trachea, in three cases from the lungs and in two cases from bronchial lymph glands. Other organs were not examined. Changes were present in the lungs of six of these animals. Bacteria of this kind were not found in any of 94 bovines and seven sheep which were also examined.

The characters of the strains showed them to belong to the haemoglobinophilic group of bacteria, and to be more nearly related to *H. influenzae* than to *H. pertussis*. They are believed to be identical with *H. influenzae suis* described and named by LEWIS and SHOPE [this *Bull.* **2.** 85]. It will be remembered that these workers were not successful in isolating the organism from healthy swine. Agglutination tests made with sera prepared with four strains showed only a minor degree of cross reaction amongst themselves and with otherwise similar strains from cases of actual swine influenza ; these cross-reactions were no more marked than those with *H. influenzae* and *H. pertussis*.—A. W. STABLEFORTH.

HELLER, Hilda H. (1933). **The Apparent Cause of an Infectious Enteritis of Very Young Lambs.**—*J. Bact.* **25.** 91-92.

This paper describes a disease in very young lambs in California ; it appears to be of the enterotoxaemia type of infection as it can regularly be transmitted by peroral administration of filtered intestinal contents. The author says that " it is highly improbable that an anaerobe causes the disease " and that " some colonies of colon bacilli isolated . . . . . produced a poison " capable of producing the disease. —J. E.

I. BOSWORTH, T. J. (1933). **The Diagnosis of *Bacterium Abortus Ovis* Infection by Agglutination.**—*Third Rep. Direct. Inst. Anim. Path. Univ. Cambridge. 1932-1933.* pp. 19-32. 7 tables, 1 appendix. [11 refs.]

II. LESBOUYRIES, DADOT, & BERTHELON. (1933). Avortement paratyphique de la Brebis. [**Paratyphoid Abortion in the Ewe**].—*Bull. Acad. vét. France.* **6.** 318-321.

I. It is known that abortion in sheep due to infection with *Bact. abortus ovis* can be diagnosed by the demonstration of specific agglutinins. It has also been shown that agglutination of this organism may be induced by heterologous sera within the salmonella group. A number of sera comprising 153 from apparently healthy sheep (abattoir samples and non-infected flocks), 19 from ewes affected two years previously and 50 from recently infected flocks were examined. Using " O " and " H " suspensions of *Bact. abortus ovis*, the majority of the normal sera agglutinated both suspensions but in low dilutions only, while in the other groups both somatic and flagellar agglutinins were well developed. Animals which had recently aborted showed titres ranging from 1 : 80 to 1 : 1,280 for both types, while titres of 1 : 80 and 1 : 160 respectively of O and H agglutinins, when present in combination, were regarded as suggestive of a recent infection. After an interval of six months, the titres were still higher than the normal.

Further tests were undertaken with *Bact. suipestifer* O antigen and *Bact. aertrycke* H type suspensions, the former because the type phase of this organism

is related to *Bact. abortus ovis*, and the latter because LOVELL has demonstrated flagellar agglutinins to aertrycke in many normal animals.

In about 50 per cent. of the sera, agglutinins in low dilutions only were found against *Bact. suipestifer* O antigen, while agglutinins for the type phase of *Bact. aertrycke* were found in all three groups. Absorption tests suggested that these latter were largely non-specific.

II. In the second article, an outbreak of paratyphoid infection in a flock of 150 pregnant ewes, 40 of which were of recent introduction, is described. The abortions commenced in the new stock but later spread to the other group and 80 animals were affected. The abortions occurred near or at the termination of pregnancy ; in the latter case, the lambs were alive at birth but died shortly afterwards. An organism of the salmonella group was isolated from the aborted material and from the foetal membranes. It was agglutinated by an anti-aertrycke serum at a titre of 1 : 14,000 and by an anti-paratyphoid B at 1 : 1,000, but was not agglutinated by an anti-Gärtner and an anti-suipestifer serum respectively. The sera of five aborting ewes agglutinated the organism at dilutions varying from 1 : 50 to 1 : 500.—R. E. GLOVER.

I. GREAVES, R. E., DEARSTYNE, R. S., & GAUGER, H. C. (1933). **The Recovery of Salmonella pullorum from the Feces of Adult Carriers of Pullorum Disease.**—*J. Agric. Res.* **47.** 441-445. 2 tables. [9 refs.]

II. ROCHAIX, A., TAPERNOUX, A., & COUTURE, E. (1933). Sur la présence des microbes du groupe Bacterium pullorum dans les oeufs de poule. [*Bact. pullorum* **in Hen's Eggs**].—*Bull. Soc. Sci. vét. Lyon.* **36.** 297-307. 2 tables. [18 refs.]

III. ROCHAIX, A., & COUTURE, E. (1933). Au sujet de quelques souches de *Bacterium pullorum*. [**Strains of** *Bact. pullorum*].—*C. R. Soc. Biol. Paris.* **114.** 647-649.

IV. PLASTRIDGE, W. N., & RETTGER, L. F. (1934). **Virulence of Salmonella pullorum.**—*J. Infect. Dis.* **54.** 23-34. 3 tables. [11 refs.]

V. BASSET, J. (1934). Prophylaxie de la Typhose aviaire. (Pullorose ; Diarrhée blanche bacillaire des poussins). [**Prophylaxis of Fowl Typhoid and Pullorum Disease**].—*Rev. vét. et J. Méd. vét.* **86.** 65-77. [2 refs.]

I. Recent studies show that adult carriers of this disease are a menace to non-reacting birds when confined with them. Specimens of faeces from 21 carrier fowls were collected : *Bact. pullorum* was obtained from two of these, and the organisms isolated were of sufficient virulence to set up the disease in experimental fowls. Difficulty was encountered in obtaining pure cultures from the faeces, but an improved technique, which was successful, is discussed.

Bacteriophage was encountered in five out of 13 birds studied.

II. The authors examined the characters of *Bact. pullorum* found in eggs from the Lyons district, to note if they were similar to those described by American writers.

Morphologically and culturally four strains examined were similar to American strains, but one of the four strains examined definitely blackened lead acetate, one gave a partial reaction and the remaining two yielded negative results. The four strains were tested out on sugars and while from the absence of gas formation the strains resembled *Bact. sanguinarium*, neither dextrose, dulcite, nor maltose were attacked. Comparative agglutination tests were also carried out.

The authors stress the point that the organisms are found in the yolk in *Bact. pullorum* infections and not in the white. The pathogenicity of such eggs for human beings is discussed.

By means of control measures, particularly vaccination with an autogenous vaccine, the laying of infected eggs can be prevented or greatly diminished.

III. This is a condensed report of II.

IV. The virulence of several strains of *Bact. pullorum* for chicks, fowls, rabbits and guinea pigs was tested. Great variation was noted, some strains being virulent for chicks and adults, others virulent for one only and others of low pathogenicity for both.

Faeces were collected from six reacting birds which had been chosen from several of the groups used in the virulence experiments and *Bact. pullorum* was isolated from four of the birds between 102 and 194 days after exposure to infection. The variation of virulence is discussed in conjunction with the relative rarity of acute outbreaks amongst adult fowls, the authors suggesting that the virulence of certain strains may be altered by the action of bacteriophage : several instances are quoted in support of this theory.

V. The author states that the organisms usually responsible for fowl typhoid are *Bact. gallinarum* and *Bact. pullorum* and their differentiation is discussed. [The use of the term fowl typhoid is usually limited to *Bact. sanguinarium* infection]. The variation in individual susceptibility of the fowl is pointed out, and attention is drawn to the effect of various factors which lower the resistance of the birds. Symptoms and lesions in the chick and fowl are recorded and methods of diagnosis are discussed.

The use of a local reaction for diagnosis, inoculating pullorin into a feather follicle, is not considered satisfactory. It is pointed out that in applying the agglutination test a single test is not sufficient. The author considers that the tube agglutination test is practically worthless because of the cost and that the rapid test on a glass plate with whole blood is satisfactory.

The usual control measures are discussed including the use of autogenous vaccines, but the author concludes that the latter is not of value.—J. E. Wilson.

Bendixen, H. C. (1933). Om Udbredelsen af nogle almindeligt forekommende Infektioner i Koens Yver, navnlig belyst gennem systematisk Undersogelse af en storre dansk Kvaegbesaetning. [**On the Extension of some Common Udder Infections in Cows ; specially illustrated by Systematic Investigation of a Large Danish Herd**].—*Med. dansk. Dyrl.* **16.** 473-483, 507-521 and 537-555. 6 figs., 6 tables. [13 refs.] [German summary : abst. from orig.]

By means of systematic cultural examination and inoculation of guinea pigs with milk from the individual quarters of 147 cows, a survey has been obtained of the extent of streptococcus, micrococcus, corynebacteria and *Br. abortus* infections within the various groups of cows arranged according to age. The herd was free from tuberculosis and had a very high yield. No female animal had been introduced into the herd for 20 years. During the past ten years all heifers have been inoculated with *Br. abortus* culture about ten and eight weeks before service. During the first lactation period it was found that 25 per cent. of the heifers had *Br. abortus*-infected udders. Thereafter the number decreased, so that by the fourth lactation period none were found. During the fifth lactation period, however, 15·4 per cent. were found ; none of the older cows were found to be infected with *Br. abortus.*

18·5 per cent. of the lactating heifers proved to be infected with streptococci in one or more quarters. The percentage of animals infected gradually rose during the subsequent lactation periods up to the eighth and ninth lactations, when 100 per cent. of the cows were infected with streptococci. A great number of the cases of streptococcus infection showed no symptoms and were apparently

latent forms. On examination of the streptococcus cultures, 85 per cent. of them proved to correspond to *Str. agalactiae*. In fermentation tests with 27 different substances these strains showed a series of properties deviating *inter se*. The most homogeneous fermentation picture was shown by the strains that did not decompose salicin.

Micrococci from one or more quarters were cultivated from 53·7 per cent. of the cows. The corresponding percentage in the case of corynebacteria was 61·2.

On clinical examination numerous teats were found with a small or large cicatrix in the orifice of the teat canal, which could only be interpreted as due to injury. Such quarters were almost always infected with streptococci. The marked connection between injury and streptococcal infection is shown graphically.

In the author's opinion the basis for combating mastitis must be a suitable arrangement of the byre, especially as regards space, as any injury caused by neighbouring cows must be avoided.—H. C. Bendixen (Copenhagen).

I. Fitch, C. P., & Donham, C. R. (1934). **A Practical Interpretation of the Scientific Evidence on Controversial Points in the Control of Bang's Disease.**—*J. Amer. Vet. Med. Ass.* **84.** 168-183. 5 tables. [15 refs.]

II. Fitch, C. P., & Donham, C. R. (1933). **Survey to Determine the Incidence of Bang's Disease in Minnesota Cattle.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 1203-1205. 1 table. [2 refs.]

I. This article will repay reading by all who are concerned with the eradication of contagious abortion and, in particular, with the interpretation of the agglutination test for this disease.

The authors believe that an animal should show complete agglutination at 1 : 100 before being regarded as positive and that it is wrong to regard all reactions at 1 : 25, or even incomplete reactions at 1 : 50, as suspicious of abortion infection.

Data collected from over 6,000 cattle representing four selected townships showed that 22 to 23 per cent. reacted at 1 : 25. The vast majority of these animals were in herds in which no higher agglutination titre was found, and in which there was no history of contagious abortion. The percentage of reactions at 1 : 25 was, moreover, nearly uniform in the different townships (21 to 25 per cent.), although the proportion of definitely positive animals varied from 1·4 to 11·3 per cent. It was not found possible to isolate *Br. abortus* from any of 66 animals which reacted at 1 : 100 or below. If reactions at 1 : 25 or 1 : 50 are regarded as suspicious, a large percentage of animals is unfairly stigmatized, the difficulties of interstate shipment of cattle are materially increased and, owing to the fact that results based on the interpretation are (in contrast to definitely negative or positive reactions) not always repeatable, the faith of the cattle owner in the test is undermined.

In drawing conclusions regarding the incidence of abortion in the cattle under report, a titre of 1 : 100 was regarded as positive and titres of 1 : 25 or 1 : 50 were regarded as negative or suspicious, according to the breeding history of the animals and the history of the herd. Of 6,383 cattle tested, 83·5 per cent. were classed as negative, 8·3 per cent. as suspicious and 7·7 per cent. as positive. Of 321 herds, 51·1 per cent. were classed as negative, 13·7 per cent. had one or two suspicious animals and 35·2 per cent. had one or more positive animals.

Vaccination methods are not regarded as having reached a stage at which they are suited to the control of the disease. Contagious abortion is not usually self-limiting. Provided that only definitely positive reactors are diagnosed as such, animals once positive should always be regarded as dangerous. The tube test was chiefly used but the rapid method gives nearly similar results.

II. A brief report on the same series of herds.—A. W. Stableforth.

I. Fritz, B. S., & Barnes, M. F. (1933). **Bang's Disease Control Work in Fourteen State Institution Herds. II. Progress Report to 1931.**—*J. Amer. Vet. Med. Ass.* **83.** 680-691. 16 tables. [1 ref.]

II. McNutt, S. H., & Walsh, F. E. (1933). **Pertaining to the Eradication of Bang's Disease.**—*Vet. Med.* **28.** 401-402. [3 refs.]

I. In their first report in 1930 [*J. Amer. Vet. Med. Ass.* **76.** 490.], the authors dealt with the difficulties met and the progress which had been made in the eradication of abortion by partial or complete segregation based on agglutination tests in these fourteen herds. The average percentage of reactors was reduced from 22·6 to about four after one year and to 0·4 after four years, many herds then being free from infection. Stress was laid on the much higher breeding efficiency and milk yield of the non-reacting animals. Reactors showed a milk yield 16 to 28 per cent. below that of non-reactors and a much smaller number of calves, even apart from abortions.

In this second report they state that all these herds are now certified free from brucella infection. Details are given of the breeding efficiency of each herd : 527 cows produced 1,734 calves, with an average inter-calving period of 11·7 months. Abortions due to various causes other than brucella infection varied from none up to 5 per cent., average 2·4 per cent. Emphasis is laid on the fact that, with a breeding efficiency of the order obtained in these herds, selection of high producing animals is made easy. This fact has, without doubt, contributed in no small measure to the increased milk yield, which is notably above that reported in 1930, when the eradication of abortion was first reaching completion, and, in many cases, double that at the beginning of the eradication programme.

II. A report is given of three animals which, from all the evidence, were apparently infected with brucella 6, 13 and 21 months before they reacted. In another herd a large number of new reactors continued to appear for a period of three years, the source of which is believed to have been to some extent calves from reactors.—A. W. Stableforth.

van der Hoeden, J. (1933). Mededeelingen van de Brucella-Bang-Commissie. No. 9. De Ophthalmo-Reactie bij Bang-infectie (besmettelijk verwerpen) der Runderen. No. 10. De Pathogenese van Brucellosis Bang. No. 11. Bepaling van het type van in Nederland gevonden Brucella-Cultures. [**Communications of the Dutch Brucella-Commission. No. 9. Ophthalmic Test in Contagious Abortion of Cattle. No. 10. Pathogenesis of** *Brucella abortus* **Infection. No. 11. Determination of the Types of Brucella found in Holland**].—*Tijdschr. Diergeneesk.* **60.** 876-888, 1025-1038 and 1148-1151. 2 figs., 14 tables. [22 refs.] [English, French and German summaries : abst. from orig.] [A German translation of No. 9 appears in *Arch. wiss. prakt. Tierhlk.* **66.** 124-135. An English translation of No. 10 appears in *J. Comp. Path. & Therap.* **46.** 232-247].

No. 9. The ophthalmic test with a special antigen was applied to 169 cows belonging to five farms ; at the same time the blood serum of these animals was used for agglutination and complement-fixation tests. It was demonstrated that the eye reaction was a very sensitive diagnostic method and that it was independent of the presence of antibodies in the blood. Soon after the oral infection of a goat and a calf with live culture, the ophthalmic test became positive, whereas after subcutaneous injection of a killed suspension, although agglutinins and amboceptors appeared, the ophthalmic test remained negative.

No. 10. Clinically, brucella infection is characterized in man especially by general malaise, in cows by obstetrical symptoms, and in horses by general and

surgical affections ; as a rule no symptoms appear in dogs. Experiments were carried out by the author in order to study the route of infection of brucella in a horse, a goat, 31 dogs and 44 guinea pigs, after administering the micro-organisms *per os*, into the conjunctival sac and in a few cases, by rubbing on the skin. Brucella organisms could be found very soon afterwards (within one hour) in the regional lymphatic glands after oral and conjunctival infection. Blood cultures were positive in dogs the day after infection, in horses and goats after three days ; cultures could be obtained from the spleen after one day (dogs and guinea pigs), from the liver after three days (dogs and guinea pigs) and from bone-marrow after three days (in dogs). This experimental study favours the suggestion that many brucella organisms after having been picked up by the regional lymphatic glands, soon escape from this site into the venous blood stream.

No. 11. According to the character of cultures containing methyl violet, gentian violet, basic fuchsin and thionin, the capacity to produce hydrogen sulphide and the atmospheric requirements of newly isolated cultures, all 82 strains of brucella cultivated from human beings, cattle, horses and dogs in Holland must be classified among the bovine type.—J. VAN DER HOEDEN (UTRECHT).

I. THOMSEN, A. (1933). Om Kalvekastningens Profylakse med Henblik paa Nyinfektioner. [**Prophylaxis of** *Br. abortus* **Infection with a View to Reinfection**].—*4. Nord. Vet.-motet. Helsingfors, 1933.* 474-499. 3 tables. [15 refs.] [Also published as *Med. Stat. Vet. Serumlab. Copenhagen*. No. 133. pp. 18. 3 tables. [14 refs.]] [German summary].

II. LANGERMAN, A. (1933). Førsog paa en rationel Bekaempelse af smitsom Kastning. [**An Attempt at Rational Control of** *Br. abortus* **Infection**].—*Maanedsskr. Dyrl.* **45.** 337-341.

I. An attempt has been made to explain the occurrence of *Br. abortus* infection in Denmark, especially with a view to the new infections of recent years. These new infections seem to occur annually in 3,000 to 5,000 herds ; it must, however, be said that the last few years show a decrease. The author suggests that a propaganda campaign be undertaken in order to educate the people on the health value of disease-free cattle.

There are indications that in *Br. abortus* infection there are modes of infection the importance of which is either wrongly explained or not understood. Thus the following sources of infection of cattle are mentioned :-the veterinary surgeons themselves, convalescents after undulant fever, dogs, cats, rats, flies and other insects, especially biting insects. The importance of milk carts, motor vans and used sacks for the storage of food is also mentioned.

II. Taking it for granted that brucella infection runs the course of a symptomless general infection in the bull and in the non-pregnant female animal, the author advocates the immunization of the non-pregnant animals in infected herds. If abortion is diagnosed in such a herd, all breeding should be stopped and all the non-pregnant animals should then be infected by feeding with discharge or placenta from cows that have aborted. Three months later breeding should again be started. If it is necessary to buy calves and heifers, they should be infected as soon as possible. If pregnant cows are purchased they must be near the end of pregnancy. They should then be infected as soon as they have calved.

—H. C. BENDIXEN (COPENHAGEN).

I. RUDOLF. (1933). Beitrag zur Bangerkrankung des Schweines in Oesterreich. [*Br. abortus* **Infection of Swine in Austria**].—*Wien. tierärztl. Mschr.* **20.** 513-522. [20 refs.]

II. Rossi, P. (1933). Le diagnostic de la brucellose porcine par l'intra-dermo-reaction. [**Diagnosis of Brucella Infection in Swine by the Intradermal Reaction**].—*C. R. Soc. Biol. Paris.* **114.** 875-878.

III. Stockmayer, W. (1933). Ueber die Brucella-Infektion bei Schweinen. Zugleich ein Beitrag zur Frage der Konstanz der Brucella-Typen. [*Br. abortus* **Infection in Swine. Constancy of Brucella Types**].—*Berl. tierärztl. Wschr.* **49.** 741-744. 2 tables. [36 refs.]

IV. Feldman, W. H., & Olson, C. (Jr.). (1933). **Spondylitis of Swine Associated with Bacteria of the Brucella Group.**—*Amer. J. Path.* **9.** 951. [Presented at 33rd Ann. Meet. Amer. Ass. Path. & Bact., Washington, D.C., May 9th & 10th].

V. Feldman, W. H., & Olson, C. (Jr.). (1934). **Isolation of Bacteria of the Brucella Group from Apparently Healthy Swine.**—*J. Infect. Dis.* **54.** 45-50. 2 tables. [3 refs.]

I. The author reports on the occurrence of outbreaks of abortion in three herds of swine in Austria. The disease was successfully combated by inoculation of dead brucella organisms.

II. The intradermal reaction was found to be reliable for the diagnosis of brucella infection in swine. In 48 hours a positive reaction was accompanied by oedema and by reddening of the skin.

III. Young pigs were found to be resistant to culture of *Br. abortus* of bovine origin administered orally. After subcutaneous inoculation with relatively large doses, specific antibodies could be demonstrated in the blood, but the organism seldom became established in the tissues. By passaging the organism through pigs it was not found that its virulence was exalted or that it had assumed the character of the porcine variety.

IV. Lesions of a specific spondylitis were found in 24 pigs and from these, organisms of the genus *Brucella* were secured by culture and by animal inoculation. The affected swine showed no observable symptoms and there were no lesions in the other parts of the body. The lesions were encapsulated abscess-like structures occupying irregular cavities in the bodies of the vertebrae. Relation of the lesions of the vertebrae to the usual pathology of contagious abortion of swine was not observed.

V. The blood sera of 102 pigs were examined for the presence of *Br. abortus* agglutinins, two proving positive. From these two animals brucella organisms were recovered from the lymphatic glands of the head and cervical region and from an abscess of the spermatic cord of one of them. These observations indicate that bacteria of the brucella group may exist in the tissues of apparently normal swine without giving rise to obvious symptoms of disease.—S. J. Edwards.

I. Spinelli, A., & Favia, N. (1933). Essai de réversion " in vitro " de la phase " R " à la phase " S " dans le groupe des " Brucelles." [**Changes from R to S Phase of Brucella** *in vitro*].—*Boll. Sez. ital. Soc. internaz. Microbiol.* **5.** 206-211. 1 table. [16 refs.] [Orig. in French].

II. Liddo, S. (1933). Le Groupe " Brucella " dans les milieux a l'oeuf. [**The Brucella Group in Egg Media**].—*Ibid.* 317-320. 1 table. [3 refs.] [Orig. in French].

III. Bareggi, G. (1934). La bonifica delle nostre stalle mediante la vaccinazione antiaborto con bacilli vivi. [**Improvement in our Stock through Vaccination with Live Anti-Abortion Vaccine**].—*Clin. Vet. Milan.* **57.** 159-162.

I. The authors used three strains of *Br. paramelitensis* and one strain of *Br. para-abortus* which represent the R phase of *Br. melitensis* and *Br. abortus*

respectively. They found that growing these strains in media to which the homologous antisera had been added increased the titre at which agglutination towards anti-paramelitensis serum occurred, whereas the titre was decreased when anti-melitensis serum was used. Although these strains were submitted to treatment *in vitro* with specific homologous anti-R serum, the S form was never produced.

II. The author studied the growth of strains of *Br. paramelitensis*, *Br. paraabortus* and *Br. abortus* on various types of egg media. Practically all the strains showed signs of growth on these media within ten days ; Petroff's medium appeared to be the least suitable and Petragnani's medium appeared to be the most suitable for the development of ***Br. paramelitensis*** and ***Br. melitensis***.

III. A typical outbreak of contagious abortion in a herd of dairy cows is described. Abortions were first seen among some recently purchased heifers and gradually the whole herd of about 60 animals became affected, although strict isolation and hygienic measures were adopted from the first. The drop in the total milk yield was estimated at 50 per cent. and the loss of calves and the expense of replacing animals which subsequently became sterile was severe ; moreover, fresh stock, especially heifers, contracted the disease as soon as they were introduced into the herd. For these reasons live *Br. abortus* vaccine was used, the results being highly successful.

The author recommends that an attenuated suspension of *Br. abortus* should be used as the vaccine, the organisms being unable to cause lesions in guinea pigs. 5 c.c. of this vaccine is injected into the caudal fold, and a second 5 c.c. dose is given ten days later. Apart from a local reaction, the general effects of vaccination are slight ; occasionally, however, abscess formation may occur. Cows should not be sent to the bull for two months and heifers for three months after vaccination. All non-pregnant and sterile animals should be vaccinated.

—J. A. Nicholson.

Sarnowiec, W. (1933). O zmiennosci pratka Brucella abortus. [**Variability of *Br. abortus***].—*Wiadom. Wet.* **12.** 197-206. 1 table. [21 refs.] [French summary : abst. from orig.]

Freshly cultivated strains of *Br. abortus* devoid of antigenic properties and of agglutinability can acquire these properties in subsequent generations of culture.

The agglutinability and antigenic properties of *Br. abortus* are closely related to each other, and are inseparable characters.

Freshly cultivated strains of *Br. abortus*, which are devoid of pathogenicity, are incapable of acquiring this character in subsequent generations of culture.

—K. Szczudlowski (Lwów).

Bennetts, H. W. (1933). **Botulism of Sheep in Western Australia and its Association with Sarcophagia.**—*J. Sci. & Indust. Res. Australia.* **6.** 137-144 and 308. 3 tables. [8 refs.]

Botulism, produced by the ingestion of toxic rabbit carcasses, has become of increasing importance in Western Australia since first reported in 1928 ; so much so that it is now regarded as causing greater economic losses than all other diseases of sheep in that state.

The unusually high incidence is attributed to the fact that a long dry period occurs annually, resulting in diet deficiencies and depraved appetite. During this period much rabbit carrion is available and this is the source of the toxin. The dietetic deficiency does not appear to be only in minerals ; protein deficiency is probably a contributory factor. Lick containing dicalcic phosphate does not always prevent the sarcophagia.

The symptoms observed in the field are described, the syndrome being typical of botulism. A toxic culture was prepared from carrion and toxin neutralization experiments showed that the causal organism [in that instance] was *Bacillus parabotulinus* [*Clostridium parabotulinum*].—W. I. B. Beveridge.

DISEASES CAUSED BY PROTOZOAN PARASITES.

I. Rastegaïeff, E. F. (1933). Zur Frage der Ueberträger der Schafpiroplasmosen in Azerbaidschan (Transkaukasien). [**The Carrier of Sheep Piroplasmosis in Azerbaijan (Transcaucasia)**].—*Arch. wiss. prakt. Tierhlk.* **67.** 176-186. 1 table. [22 refs.]

II. Thomson, J. G., & Hall, G. N. (1933). **The Occurrence of *Babesia motasi* Wenyon, 1926, in Sheep in Northern Nigeria, with a Discussion on the Classification of the Piroplasms.**—*J. Comp. Path. & Therap.* **46.** 218-231. 6 figs. [56 refs.]

I. This article records the infection of larvae and nymphs of *Rhipicephalus bursa* by feeding on a sheep which had been inoculated with a local mixed piroplasm infection at Zurnabad. After moulting, the ticks were sent to Leningrad, which is free from sheep piroplasmosis, and allowed to feed on a lamb. The lamb developed an infection with three varieties of piroplasm—"*Piroplasmosis ovis*," "*Babesiella ovis*" and "*Francaiella ovis*"—and with "*Gonderia ovis*" and *Anaplasma ovis*.

II. This article records that two sheep imported from French West Africa into Nigeria developed an infection with *B. motasi*, a parasite not previously encountered in Nigeria. Subinoculation into local sheep did not produce a reaction, which suggests that the local sheep had acquired an immunity. One of the infected sheep died exhibiting enlargement and congestion of the spleen, and congestion of the kidneys, but no haemoglobinuria. The other animal recovered after a febrile reaction lasting three days.

A discussion of the classification of piroplasms follows, the authors agreeing with Wenyon, except that they remove the small forms, *B. mutans* and *B. sergenti*, from the family babesiidae to the family theileriidae.—U. F. Richardson.

Cuillé, Chelle, & Cazaux. (1934). Contribution à l'étude des piroplasmoses du mouton. Premières observations d'anaplasmose en France. [**A Contribution to the Study of Ovine Piroplasmosis. First Observations on Anaplasmosis in France**].—*Rev. gén. Méd. vét.* **43.** 129-141. 1 fig. [24 refs.]

This paper records observations on a disease of sheep in the south-east of France. Cases occurred in 1927, 1928 and 1929, after which the disease disappeared. In 1932, another outbreak occurred, but no further cases were encountered in 1933. The number of sheep attacked in any outbreak rarely exceeded 10 per cent. of the flock. The course of the disease was rapid in the individual animal, rarely lasting more than 48 hours. Recovery was rare.

The disease is characterized by an icteric discolouration of the mucous membranes and colouration of the urine. The temperature is raised very little. Pregnant females abort. On *post-mortem* examination, the spleen is much enlarged and the kidneys discoloured. Some exudation into the pericardium is often encountered, and the small intestine is congested.

Microscopic and cultural examination failed to reveal any bacterial infection, but small grains (0·5μ to 0·8μ), which stained violet blue with Giemsa stain, were detected in the red blood corpuscles. Two to three infected cells were present in each field of the microscope. Subinoculation into an old sheep from another area

caused a febrile reaction but no jaundice or haemoglobinuria. Corpuscular grains appeared and persisted for about six weeks, but could be made to reappear later by the intravenous injection of trypanblue or the subcutaneous injection of adrenalin. The injection of trypanblue into a normal sheep failed to produce similar bodies. The authors conclude that the disease is an anaplasmosis which is acute and accompanied by haemoglobinuria, in contrast to the disease of Africa which is chronic and characterized by anaemia without haemoglobinuria.

In view of the small number of animals attacked in an infected flock and the periodic disappearance and recurrence of the disease, it is suggested that it is an enzootic condition to which many animals have established immunity. A similar condition, " ictère hémorragique," in sheep has been described in France for a long time and has been ascribed to several causes, which, however, fail to explain the small number of animals attacked in a flock.—U. F. Richardson.

Cernaianu, C. (1933). Piroplasmose vraie du cheval et pirobleu. [**True Piroplasmosis of the Horse and Piroblue**].—*Bull. Soc. Path. exot.* **26.** 1258-1260.

Holness, H. J. (1934). **The Incidence of Equine Piroplasmosis.**—*J. Roy. Army Vet. Corps.* **5.** 71-74. 2 tables.

The first article records the treatment of *Babesia caballi* infection in the horse with piroblue and concludes that this drug, in the doses recommended, is not so satisfactory as trypanblue. A dose of 2 g. of piroblue is required for severe cases in adults but they support this dose badly. Whilst 1 g. doses are recommended for foals and mild cases in adults, this dose appears to be insufficient and may cause alarming symptoms. Eight animals were treated with piroblue with three deaths, whilst 21 animals were treated with trypanblue and all recovered.

The second paper records observations on biliary fever in army horses at Secunderabad. The disease is seasonal, being prevalent from March or April to September, and outbreaks appear to be connected with the prevalence of flies. The freedom from the disease of certain units and of mules is explained by the use of local animals which have acquired immunity in their youth.

Clinical diagnosis should be confirmed by microscopic examination or the graduated tube test [Davenport, C. this *Bull.* **4.** 292.], but neither of these methods are considered infallible.

Treatment should be undertaken early. Quinine hydrobromide given intravenously or intramuscularly has proved excellent, whilst recently " plasmoquin " has given equally satisfactory results. The latter drug is more expensive but can be given by the mouth.

The natural immunity acquired by recovery from an attack suggests that a satisfactory method of artificial immunization might be devised.

—U. F. Richardson.

I. Cordier, G., & Ménager, M. (1933). Theiléríose dispar et gonacrine. [*Theileria dispar* **Infection and Gonacrine**].—*Bull. Soc. Path. exot.* **26.** 1046-1051. [2 refs.]

II. Ajwani, G. A., & Subbarayudu, M. V. (1934). **A Fatal Case of Theileria mutans in a Bull.**—*Ind. Vet. J.* **10.** 229-231.

III. Adler, S., & Ellenbogen, V. (1934). **A Note on the Pre-Immunisation of Calves against** *Theileria annulata*.—*Vet. Rec.* **14.** 91-93.

I. This paper records the results of the treatment of cattle infected with *Th. dispar* by intravenous injections of 1 g. gonacrine, in three naturally occurring outbreaks of the disease. Although in one outbreak the results appeared to be

satisfactory, in another outbreak the mortality in treated animals was as high as that in the untreated cattle, and the authors conclude that the drug does not give satisfactory results in naturally occurring cases.

II. This article records a fatal case of infection with *Th. mutans* in India, associated with haematuria and diarrhoea. Blood smears revealed the presence of parasites in almost every red corpuscle, and Koch's " blue bodies " were found free in the blood plasma in large numbers. Treatment, *per os*, with pulvis chirata and sodium bicarbonate and intravenous injections of tartar emetic proved useless. [The nature of the parasite appears to have been determined purely on microscopic evidence].

III. This paper records attempts to produce immunity to *Th. annulata* in imported cattle in Palestine by their inoculation as calves. Imported breeds of cattle are said to suffer a mortality of 35 per cent. from theileriasis, but it has been noticed that the disease is considerably milder in calves and that native cattle appear to be resistant. It was thought that the resistance in native cattle, which are usually pastured, might be due to infection as calves. Tests were made on native cattle from non-endemic areas and the adult animals from such areas were not found to be resistant.

Fifty-five calves of imported breeds were inoculated with infected blood and suffered a mortality of only 9·1 per cent. A rise of temperature, lasting two days, occurred eight to 12 days after inoculation. This was followed by a remission of about a week and then a second rise of temperature lasting about 20 days : during this second febrile period the parasites appeared in the blood.

—U. F. Richardson.

I. van Hoof, L., & Henrard, C. (1933). Recherches sur les trypanosomes pathogènes du betail à Leopoldville (Congo belge). [**Research on the Pathogenic Trypanosomes of Cattle at Leopoldville (Belgian Congo)**].—*Ann. Soc. belge Méd. trop.* **13.** 495-516. 2 tables. [11 refs.]

II. Carmichael, J. (1934). **Trypanosomes Pathogenic to Domestic Stock and their Effect in Certain Species of Wild Fauna in Uganda.**—*Ann. Trop. Med. & Parasitol.* **28.** 41-45. [6 refs.]

III. Corson, J. F. (1934). **Infection of the Cerebro-Spinal Fluid of an Antelope with *Trypanosoma rhodesiense*.**—*Ibid.* 141.

I. Records investigations made on the trypanosome infection of *Glossina palpalis* caught in fly traps round Leopoldville. In an area with little game but a small herd of cattle, 3·5 per cent. of the tsetse were infected with *Tryp. congolense* ; in a game area 1·6 per cent. were infected ; whilst in an area where cattle and game were scarce and small stock prevalent, the fly infection was 0·7 per cent.

From general observation of cattle inhabiting tsetse areas in the Congo, it seems that trypanosomes can be demonstrated in 60 per cent. of the animals, but that they are not observed in the blood unless the animals are worked. When new cattle are introduced into the area they contract trypanosomiasis and die, and the disease originating from them may spread and cause losses amongst the local cattle. An experiment was conducted by feeding the *G. palpalis* caught in the fly traps on 11 goats and five guinea pigs. The goats developed mixed infections of *T. congolense* and *T. vivax* and the guinea pigs *T. congolense* and a polymorphic trypanosome. It is recorded that *T. vivax* was not detected in the tsetse until one goat became infected, but that the infection then spread rapidly amongst the flies until 9·6 per cent. showed infection. At the last stage of the experiment the glossina infection was *T. congolense* 10·7 per cent. and *T. vivax* 19 per cent. It is suggested that in nature *T. congolense* infection is enzootic and *T. vivax* infection

epizootic and that, when an outbreak of disease results, the first stage is associated with a preponderance of *T. congolense*, this being followed by a general infection with *T. vivax* and the height of the mortality being associated with a mixed infection.

Dn 12, 18 and 20, associated with tryparosan and tartar emetic, were tested as to their effects in the treatment of goats exposed to reinfection, but there was scarcely any modification of the infection rate, either in the flies or the animals.

II. This article records the results of the inoculation of wild animals from tsetse-free areas with trypanosomes.

T. brucei infection proved fatal to a blue duiker, a jackal and a multimammate mouse, whilst transient non-fatal infections were produced in a waterbuck and reedbuck. A bush-pig proved resistant to infection.

T. congolense proved fatal to a jackal; transient infections resulted in two species of duiker and reedbuck; an oribi, a waterbuck and a bush-pig proved refractory. No trypanosomes could be detected in the cerebrospinal fluid of the duiker which succumbed to *T. brucei* infection.

A few of the experimental animals died from pneumonia, acute enteritis and worm infestation, but many are still alive and observations are being continued.

III. This short note records that a duiker, inoculated with *T. rhodesiense* by the injection of the salivary glands of infected *G. morsitans*, contracted infection and died. Trypanosomes were demonstrated in the cerebrospinal fluid.

—U. F. Richardson.

I. Bourguignon, G. (1933). A propos de la trypanosomiase virulente du porc. [**The Virulent Trypanosome of Swine**].—*Bull. Soc. Path. exot.* **26.** 781-784.

II. Francke, G., Standfuss, R., & Schunke, P. (1933). Beobachtungen über die "Surra" der Kamele. [**Observations on *Tryp. evansi* Infection (Surra) in Camels**].—*Berl. tierärztl. Wschr.* **49.** 605-607. 1 fig.

I. The author considers it unnecessary to adopt the name *Tryp. porci* for the virulent trypanosome of the pig as suggested by Schwetz [this *Bull.* **3.** 532]. He considers that *T. simiae* is the virulent trypanosome of swine and that, when *T. simiae* is superimposed on a *T. congolense* infection in the pig, variable types of organisms are present, particularly when the animal is *in extremis*. He considers that the *T. congolense* group cannot be divided by morphological character, as differences occur in the morphology of individual organisms creating the so-called intermediate types.

Observations are recorded on outbreaks of trypanosomiasis of swine in which benign infections were associated with a trypanosome of the *congolense* type, and virulent infections were associated with a polymorphic type of trypanosome in which individuals could be detected approaching *T. congolense*, *T. montgomeryi*, *T. simiae*, *T. rodhaini* and even *T. uniforme*.

II. This paper records the detection of a surra infection in 16 out of 20 circus camels, imported into Germany from Russia (Turkestan). In 12 animals trypanosomes were detected in the blood by microscopic examination, and in four animals, infection was only demonstrated by subinoculation. Three of the animals died with symptoms of colic, the remainder appeared to suffer no ill effects. A series of rats and mice was inoculated with fresh blood and defibrinated blood from the camels and, whilst the inoculated mice gave the earliest evidence of infection, yet 14 rats developed trypanosomiasis against 12 mice. The fresh blood inoculation gave earlier evidence of infection than inoculation with defibrinated blood.

—U. F. Richardson.

Launoy, L. (1933). Influence de la splénectomie sur l'infection expérimentale de la Souris par *Trypanosoma congolense* et sur la thérapie synergique

étiologique de celle-ci. **[The Influence of Splenectomy on the Experimental Infection of the Mouse by *Tryp. congolense* and on its Aetiological Synergic Therapy].**—*C. R. Soc. Biol. Paris.* **113.** 1514-1517. [9 refs.]

Schwetz, J. (1934). L'influence de la splénectomie sur l'évolution de *Trypanosoma lewisi*. **[The Influence of Splenectomy on the Development of *Tryp. lewisi*].**—*Bull. Soc. Path. exot.* **27.** 62-70. 4 tables. [6 refs.]

The first communication records experiments carried out on white mice to ascertain the influence of splenectomy on the resistance to trypanosome infection, and the part played by the reticulo-endothelial system in the effect of treatment. The incubation period and the period of survival after infection were the same for splenectomized mice and normal controls. Treatment of infected splenectomized mice and infected control mice with " Bayer-205," or with that drug and an antimony salt, indicated that though splenectomy might increase the time required to clear the peripheral circulation, yet it did not influence the ultimate result of treatment. [Synergic therapy is treatment by a combined method, with the object of procuring an increased reaction against the causal irritant].

The second communication records experiments on the behaviour of *T. lewisi* in splenectomized rats and normal controls. There was no marked difference in the course of the trypanosome infection in the two classes of animals.

After the splenectomy of 14 rats in which no infection had been detected, trypanosomes appeared in two. Thirteen rats were infected with *T. lewisi*, allowed to recover and then splenectomized. Ten of them remained free, but trypanosomes reappeared in three.—U. F. Richardson.

Hu, C. H. (1934). **Studies on the Mature and Immature Lymphoid Cells of Spleen, Lymph Nodes and Thymus of Normal Rats and Rats Infected with *Trypanosoma brucei*.**—*Amer. J. Path.* **10.** 29-41. 39 figs. on 3 plates, 4 tables, 1 chart. [10 refs.]

Hu, C. H., & Ch'in, K. Y. (1934). **Studies on the Mature and Immature Lymphoid Cells of the Peripheral Blood of Normal Rats and Rats Infected with *Trypanosoma brucei*.**—*Ibid.* 43-59. 1 text fig., 90 figs. on 1 plate, 5 tables, 2 charts. [9 refs.]

For these studies, small pieces of the desired tissue were removed with fine scissors and placed in a drop of rat serum. The tissue was scraped till the serum was slightly turbid and then a drop was transferred to a coverslip which was instantly placed on a slide previously coated with neutral red and janus green.

Lymphoid cells are divided into :-(1) lymphoblasts with basophilic cytoplasm and clear nuclei with irregular chromatin granules ; (2) large and medium lymphocytes with faintly basophilic cytoplasm ; (3) small lymphoid cells with scanty cytoplasm and small round nuclei ; (4) plasma cells with neutral cytoplasm and eccentric nuclei and (5) cells of the reticulo-endothelial system with acidophilic cytoplasm and fine chromatin masses.

In *T. brucei* infection of rats there is a lymphoblastic hyperplasia of the spleen and lymph glands with an increase in the percentage of lymphoblasts and plasma cells. The appearance of many large lymphoblasts is due to the hypertrophy of small primitive cells. These hypertrophic lymphoblasts produce, by mitosis, other lymphoblasts which become plasma cells. The hyperblastic reaction of the thymic cortical cells is practically negligible, which suggests that the cells of the thymic cortex are not of lymphoid origin.

In the blood, there is a marked increase in the number of lymphoblasts on the fifth day, as a result of proliferation of circulating lymphoblasts and emigration of tissue lymphoblasts. On the sixth day these cells decrease, probably as a result

of cell destruction or exhaustion of their proliferating power. Most of the blood lymphoblasts, in contrast to those of the spleen and lymph glands, contain neutral red bodies.

The inoculated rats were divided into two groups, those dying on the fifth and sixth days, and those dying on the eighth and ninth days. In the first group there was a rapid rise in the number of blood parasites to a peak, and then death ; a transient leukopenia ; a marked increase in the number of lymphoblasts and large immature lymphocytes on the fifth day and an increase in the number of monocyte-like cells at the end of the infection.

In the second group there was a gradual rise of parasites, followed by a rapid fall, and finally a sharp rise before death. The number of small lymphocytes rose to normal on the sixth day but fell at the time of death, and the number of lymphoblasts, after a rise on the fifth day, later fell, but not to such an extent as to be below normal.—U. F. Richardson.

I. Gehring, K., & Murray, C. (1933). **Cultivation of** *Trichomonas bovis*.—*Cornell Vet.* **23.** 335-343. 6 figs. on 1 plate. [16 refs.]

II. Küst. (1933). Trichomonadenabort des Rindes. [**Trichomonad Abortion in Cattle**].—*Deuts. tierärztl. Wschr.* **41.** 785-789. [17 refs.]

III. Bos, A. (1933). Ueber Trichomoniasis bei Tauben. III. Mitteilung : Weitere Beobachtungen über die Kultur und Pathogenität von *Trichomonas columbae*. [**Trichomoniasis in Pigeons. Part III. Culture and Pathogenicity of** *Trichomonas columbae*].—*Zlb. Bakt. I.* (*Orig.*). **130.** 220-227. [4 refs.] [Parts I & II see this *Bull.* **3.** 689 and **4.** 29].

I. This article records research work on the cultivation of *Trichomonas bovis*, the trichomonad associated with bovine abortion. The best results were obtained with L.E.B. medium, whilst a medium of testicular tissue suspended in saline was also successful. No growth seemed to occur in media which contained only dissolved substances. The L.E.B. medium was composed of four eggs and 50 c.c. Locke's solution inspissated at 15 lbs. pressure for 30 minutes and then covered with a mixture of 0·5 c.c. rabbit blood and 100 c.c. Locke's solution. For contaminated material 0·1 c.c. of crystal-violet solution (1 : 1,000) was added to each 100 c.c. of the Locke blood mixture. This was harmless to the protozoa but greatly restricted bacterial growth.

Growth occurred in 24 hours and reached its maximum in 48 to 72 hours, when transfers were made. One strain, from heavily infected material, was kept for nine weeks. Apparently the bacteria become accustomed to the dye and eventually overgrow the protozoa. Cultivation from vaginal discharge was usually unsuccessful on account of the heavy contamination, and in no case could trichomonads be demonstrated by culture in vaginal discharge which had been negative to microscopic examination. Unlike *T. fecalis*, *T. bovis* does not ingest bacteria.

II. This paper records the infection of a bull by the inoculation into the sheath of exudate from a case of pyometra in a cow in which numerous trichomonads were present. The penis showed reddened nodules, and trichomonads were detected in secretion found in the folds of the prepuce. After partial recovery, the bull was allowed to serve a healthy cow. Five hours after service the vulva commenced to swell, the mucous membrane was reddened and a muco-purulent exudate appeared. On the third day trichomonads were detected in the exudate. The cow aborted 16 weeks later, and trichomonads were present in the foetus, after-birth and amniotic fluid.

The penis and sheath of the bull were carefully washed with normal saline. Later examination failed to reveal nodules or trichomonads, and no symptoms of

disease resulted from the service of two other cows. In the case of the infected cow trichomonads disappeared nine days after the abortion.

The author recommends that the following measures should be adopted in infected herds :- (1) veterinary inspection of all female animals in the herd, particularly those which, from a study of the stud records, may be implicated in the spread of disease ; (2) all infected animals to be treated under veterinary advice and all service discontinued until recovery is established ; (3) the inspection and treatment of all bulls, any bull which is lazy in service should be considered as suspect ; (4) all service to be stopped for six to eight weeks ; (5) no cows from outside the herd to be allowed service by the herd bulls unless a veterinary certificate of health is produced ; (6) no bought cows to be served until they have been passed by a veterinary inspection and (7) every cow to be treated two to three hours before service, and every bull after service, in accordance with veterinary advice.

III. This article records the obtaining of a pure culture of *T. columbae*, and, after 11 subcultures, the inoculation of pigeons with the production of typical necrotic lesions. From the point of inoculation the trichomonads migrated to other uninjured organs. This is claimed as the first definite proof of the pathogenicity of a trichomonad.

Pure cultures of the organism could be grown on L.E.B. medium or in liver broth, but not on peptone blood or on Maciel's serum medium.

—U. F. Richardson.

I. Comandon, J., & de Fonbrune, P. (1932). Sortie d'une Hémogregarine de son kyste endoglobulaire, obtenue par une nouvelle technique de microdissection. [**The Removal, by a New Technique of Microdissection, of a Haemogregarine Encysted in Blood**].—*C. R. Soc. Biol. Paris.* **111.** 999-1001. 1 fig. [2 refs.]

II. Régnier, J., & Neipp, L. (1933). Essais comparatifs de deux méthodes microscopiques de numération des microbes : méthode du compte-microbes et méthode de Wright. [**A Comparison of Two Microscopic Methods of Counting Bacteria : The Calculation Method and Wright's Method**].—*Ibid.* **112.** 40-42. [3 refs.]

I. A drop of oil is placed on a glass slide under the microscope and a drop of blood is carefully placed under the oil by means of a pipette. A pair of fine electrodes are then applied on each side of the blood corpuscles containing the parasites and a weak electric current is passed. This has the effect of haemolysing the blood and allowing the encysted parasites to be set free without suffering any damage.

II. The authors found that Wright's method of counting bacteria gives more consistent and higher results than the direct calculation method. Moreover, the former method is carried out with much less difficulty.—J. R. M. Innes.

Hegner, R. (1934). **Specificity in the Genus Balantidium Based on Size and Shape of Body and Macronucleus, with Description of Six New Species.**—*Amer. J. Hyg.* **19.** 38-67. 55 figs., 6 tables. [30 refs.]

Ratcliffe, H. L. (1934). **Intestinal Lesions Associated with Amebic and Balantidial Infection in Man and Lower Animals.**—*Ibid.* **19.** 68-85. 15 figs. on 2 plates. [22 refs.]

The first article discusses the differentiation of species of balantidia by measurement of the length and breadth of the body and macronucleus of vegetative forms. Sexual forms of the parasites are smaller and if these are included a wider range of measurements is obtained. Judging by this method of differentiation the two

parasites of the pig are distinct species, but *Balantidium coli* of the pig is identical with *Bal. coli* of man. *Bal. coli* has an average length of 70·9μ and a breadth of 58·9μ, the ratio of breadth to length being 1 : 1·2. *Bal. suis* has an average length of 74·1μ and a breadth of 52·2μ, the ratio of breadth to length being 1 : 1·42. Six new species of balantidium are described from parrots, monkeys, ostrich and camel (*Bal. cameli*).

The second paper records observations on intestinal sections from two cases each of intestinal amoebiasis and balantidiasis of man, two normal pigs, two pigs infected with swine fever, a capybara and a red howler monkey. It is concluded that the protozoa elaborate a cytotoxic substance causing tissue degeneration followed by invasion by bacteria. The effect is a necrosis and it is only after necrosis that the protozoa invade the tissues. The resistance to the host must be impaired before the intestinal tissues are subject to necrosis. *Post-mortem* penetration of tissue accounts for the fact that isolated balantidia or endamoebae are found deep in the intestinal wall and, in some cases, their situation may be due to carriage by the knife used at the autopsy.—U. F. Richardson.

DISEASES CAUSED BY VIRUSES.

I. D'Costa, J., & Singh, B. (1933). **Rinderpest : Clinical Syndrome in Goats in India.**—*Ind. J. Vet. Sci. & Anim. Husb.* **3.** 122-128. 1 plate. [10 refs.]

II. Banerji, P. C. (1933). **The Duration of Immunity in Calves Inoculated by the Goat Virus *cum* Serum Method against Rinderpest.**—*Ibid.* 338-345. 2 tables. [8 refs.]

III. Crawford, W. (1933). **Rinderpest – Transmission of Infection by Contact.** —*Ibid.* 399-401.

IV. Curasson, G. (1933). La Peste Bovine en Afrique. **[Rinderpest in Africa].** —*Bull. Acad. vét. France.* **6.** 348-351. [2 refs.]

V. van Saceghem, R. (1933). Les peaux sechées provenant d'animaux pesteux peuvent-elles propager la peste bovine ? **[Can the Dried Hides of Infected Animals Spread Rinderpest ?]**—*Ann. Soc. belge. Méd. trop.* **13.** 517-519.

VI. Datta, S. C. A., & Rajagopalan, V. R. (1934). **An Unusual Case of Chronic Rinderpest with Special Reference to the Carrier Problem in this Disease.**—*Ind. Vet. J.* **10.** 202-225. 5 charts. [85 refs.]

I. In view of the confusion which exists between pleuro-pneumonia of goats and rinderpest in these animals, the author records the symptoms of rinderpest as seen in inoculated goats in India. The susceptibility of Indian goats to rinderpest varies with the race, the region of origin, the climate, the age and the sex. In the acute form of the disease there is an abrupt rise of temperature on the fourth or fifth day after inoculation and, in a large proportion of cases, a secondary rise of temperature during the second week with marked symptoms of pneumonia. Buccal ulcers are rarely seen. The faeces are at first hard and dry, then soft and pasty, and later watery diarrhoea may develop. In the subacute form of the disease pneumonic symptoms are often absent.

On *post-mortem* examination there is congestion and ulceration of the pharynx and congestion of the abomasum, small intestine, caecum and rectum in addition to the evidence of pleurisy and pneumonia.

II. This article records the inoculation of calves with a goat-adapted rinderpest virus and anti-rinderpest serum and their subsequent reaction to a test inoculation with ox rinderpest virus. No deaths resulted from the test inoculation with ox virus. It is interesting to note that complications due to piroplasmosis

occurred in the calves inoculated with goat virus to the extent of 13 per cent., against 11 per cent. previously encountered in a series of calves inoculated with ox virus. This is held to indicate that this complication of immunization is largely due to a resuscitation of a pre-existing infection with babesia.

III. This communication records that in an outbreak of rinderpest in Ceylon, in an area which had been free from the disease since 1916, the disease spread rapidly in buffaloes, but showed little tendency to attack cattle. When cattle were affected the mortality was as great as in buffaloes. It is suggested that the disease was spread by biting flies which had greater opportunity of attacking buffaloes than cattle.

IV. This article is written to refute a suggestion that the French West African colonies have not pulled their weight in the suppression of rinderpest. It is pointed out that, throughout tropical Africa, rinderpest has only been eradicated in areas of European settlement. As regards veterinary staff, the French West African colonies compare favourably with the English colonies, and funds have been provided for an increase, though there has been some difficulty in recruitment. The author considers that the African colonies could be freed from rinderpest in ten to twelve years if the colonizing powers would co-operate in comprehensive measures.

V. This article records experiments on the infectivity of the hides of cattle which had died from rinderpest. The experiments were undertaken in view of the restrictions placed on the movement of hides from infected areas, and the rapid deterioration which occurs in these commodities if stored in native houses. Emulsions of hides of animals which had died between five and ten days previously failed to set up rinderpest when inoculated subcutaneously into susceptible cattle.

VI. This article reviews the literature on the survival of the rinderpest virus in animal carriers – domestic animals and susceptible game – and records the death of a bull which was inoculated with goat virus and developed a febrile reaction lasting from the fourth to the ninth day. The animal died 74 days after inoculation and *post-mortem* examination revealed lesions consistent with the assumption that death was due to rinderpest. Specimens of blood and spleen were collected and stored four and a half days in the refrigerator. On inoculation into susceptible cattle the blood failed to cause any reaction but the splenic material caused febrile reactions in two animals. One animal died and exhibited lesions typical of rinderpest; the other recovered and proved to be immune when inoculated subsequently with rinderpest virus.—U. F. Richardson.

I. Records, E., Vawter, L. R., Baker, F. H., & Woodward, G. T. (1933). **Equine Encephalomyelitis.**—*Univ. Nevada Agric. Expt. Sta. Bull.* No. 132. pp. 22. 12 figs., 1 table. [12 refs.]

II. Meyer, K. F. (1933). **Equine Encephalomyelitis.**—*North Amer. Vet.* **14.** No. 6. 30-48. 2 tables.

III. Olitsky, P. K., Cox, H. R., & Syverton, J. T. (1934). **Comparative Studies on the Viruses of Vesicular Stomatitis and Equine Encephalomyelitis.** —*J. Exp. Med.* **59.** 159-171. [14 refs.]

IV. Meyer, K. F. (1934). **Equine Encephalomyelitis in 1933.**—*Anim. Path. Exch. Univ. Illinois.* March, April, May. pp. 4.

V. Records, E., & Vawter, L. R. (1934). **Equine Encephalomyelitis Immunization.**—*J. Amer. Vet. Med. Ass.* **84.** 784-798. 2 tables. [5 refs.]

I & II. These papers give systematic descriptions and summaries of the knowledge of equine encephalomyelitis by two groups of workers who have investi-

gated the disease in Nevada and California respectively. The first paper describes four clinical types – the sleepy, paralytic, apoplectic and violent : these are well illustrated by photographs. The differential diagnosis between encephalomyelitis, botulism, myoglobinuria and heat stroke is dealt with in tabular form and full directions for the symptomatic treatment and control measures are given. Not much is known about the epidemiology or immunity. Not all exposed horses contract the disease and a horse can have the disease a second time.

Meyer covers the same ground and describes experiments on active and passive immunization on laboratory animals and horses. The results were not uniform [see V below for later progress, also this *Bull.* **3.** 542].

Illness in three human beings, in contact with infected material, is described, one of whom died. Two were farm workers and the other was a veterinarian. The illness was of the type associated with encephalitis. In the fatal case, death occurred on the tenth day. Experimental proof of infection was not obtained. Serum from one of the convalescents did not neutralize the virus.

III. A more detailed account of the work previously reported elsewhere [this *Bull.* **4.** 352]. The mouse was found to be the best experimental animal for work with these viruses, as they both regularly cause a rapid and fatal encephalitis in this animal. The mouse is also susceptible to the intranasal installation of these viruses. The histological changes caused are described. Both viruses can be cultivated on minced chicken embryo tissue suspended in Tyrode's solution.

IV. This paper gives the incidence of encephalomyelitis in the United States of America in 1933. Bad outbreaks occurred in the eastern states of Maryland, New Jersey, Virginia and Delaware and in the middle-west states of Utah, Colorado and Texas. The mortality varied between 20 and 60 per cent. in the middle-west and was about 90 per cent. in the east.

Meyer here states that the curative value of immune serum is not yet established, as hitherto the mortality has only been somewhat reduced by its use. The eastern virus is much more potent than the western virus and horses immunized to western virus are still susceptible to eastern virus.

Calves and goats have been successfully infected with equine encephalomyelitis virus.

Beyond the experimentally proved fact that the mosquito, *Aedes aegypti*, can transmit the disease [this *Bull.* **4.** 107.] and that transmission follows the intranasal installation of virus, nothing is known about natural infection.

V. The authors describe in detail immunization tests in 21 horses procured from a locality where encephalomyelitis was unknown. Seven horses received one subcutaneous injection of a moderately virulent virus (virus A), seven received the same treatment followed 14 days later by a more virulent strain (virus B) and the seven controls were not vaccinated. All the horses were kept together and all were tested for immunity at various dates by the intracranial injection of (in most cases) massive doses of the B virus.

The results showed that a strong immunity had already developed in both test groups 20 days after the first vaccine, but that immunity had decreased after five months, as the remaining horse in each group, when submitted to the infection test after that interval, succumbed, as did also all the controls.

In a second experiment on 15 horses (two test groups of six and three controls), six horses received virus B alone and six virus B plus antiserum in various proportions. One virus-alone horse died of encephalomyelitis ten days after vaccination and two of the second group reacted severely, but recovered, and only one control died as the result of the infective test. All the other horses in each group survived. The results with control horses in these two experiments were, therefore, con-

flicting, the horses of the second experiment appearing to be immune when tested.

Virus neutralization tests *in vitro* with the serum of 22 vaccinated horses and 18 controls were carried out with negative results, neutralization occurring in only three cases.

Field vaccination tests were carried out on 225 horses from an infected area – all horses being given a virus B suspension subcutaneously. Five horses died of acute encephalomyelitis and the rest, with some exceptions, showed no reaction. A second lot of 288 horses were vaccinated with virus A with no subsequent loss. The disease did not break out in the area containing these vaccinated horses, so their immunity could not be assessed.

All the above work was performed with strains of the western type of encephalomyelitis virus. [For other papers on this disease see this *Bull.* **3.** 652 and **4.** 351 and 427].—J. E.

CAILLOT. (1933). Epidémie d'Encéphalite enzootique à Liergues (Rhône). [**Epidemic of Equine Enzootic Encephalitis at Liergues (Rhône)**].—*Bull. Soc. Sci. vét. Lyon.* **36.** 121-129. [1 ref.]

This paper records an outbreak of equine encephalitis in a stable of four horses at Liergues, France. Two infected horses were destroyed and another died. The infection was diagnosed on clinical grounds as of an encephalitic nature. Rabbits inoculated with material from an affected horse failed to contract encephalitis. Even so, the author is of the opinion that the infection was identical with that described by MOUSSU and MARCHAND [(1924). *Rec. Méd. vét.* **100.** 1].

The disease is said to be rare in France, but in the discussion which followed the paper, outbreaks were recorded by other observers who had also obtained positive results on the subinoculation of rabbits.—U. F. RICHARDSON.

INVERTEBRATE VECTORS OF DISEASE.

I. OLENEV, N. O., & ROZHDESTVENSKAJA, V. S. (1933). **A Pathological Condition Observed in Ticks (Ixodidae).**—*Parasitology.* **25.** 478-479. 5 figs., 1 plate.

II. COOLEY, R. A. (1934). **Occurrence of Tick Parasites in Nature in Southern Idaho.**—*Publ. Health Rep. Washington.* **49.** 111-112.

III. PHILIP, C. B., & JELLISON, W. L. (1934). **The American Dog Tick, Dermacentor variabilis as a host of Bacterium tularense.**—*Ibid.* 386-392. [10 refs.]

IV. HALL, M. C. (1934). **A Military History of the American War Against Cattle Fever Ticks and Piroplasms.**—*North Amer. Vet.* **15.** No. 4. 51-60. 1 fig., 1 map.

I. Four specimens of *Hyalomma* sp. and *Dermacentor niveus* taken from horses in Turkestan showed milky white papular elevations on the thinly chitinized parts of the body. The cause and significance of the condition are unexplained.

II. *Ixodiphagus texanus* Howard was found parasitising two nymphs of *Ixodes hexagonus* var *cookei* (Packard) taken on a wood chuck.

III. The American dog tick was experimentally infected with *Bact.* [*Pasteurella*] *tularense* in the adult and larval stages. Larvae from the adults fatally infected a mouse and resultant engorging nymphs were shown to contain virulent organisms. Nymphs reared from infected larvae produced fatal infections in two guinea pigs and infection was produced by resultant adults in separate guinea pigs, both by feeding and inoculation.

IV. Hall gives a popular historical account of the campaign of eradication of the cattle fever piroplasms and ticks. Throughout the article references are made in pseudo-military style, the entomologists being referred to as intelligence officers, the ticks and piroplasms as the enemy and so on. The measures adopted were fortnightly dipping in arsenical dips from March to November, a pasture rotation as well as quarantine and legislative measures.

Immense progress has been made since 1906 and the end is now in sight as 88 per cent. of the territory previously infested is now free. The total cost will have been somewhat more than 40 million dollars which is, however, less than the loss sustained annually before eradication commenced.

It is in addition a humanitarian achievement of the first magnitude, as thousands of cattle are saved from suffering and death.—J. S. Steward.

DISEASES CAUSED BY METAZOAN PARASITES.

I. Roberts, R. A. (1933). **Biology of *Brachymeria fonscolombei* (Dufour) a Hymenopterous Parasite of Blowfly Larvae.**—*U.S. Dept. Agric. Tech. Bull.* No. 365. pp. 21. 5 figs. [14 refs.]

II. de Vries, A. H. (1933). **A Cheap and Effective Blowfly Trap.**—*Farming in S. Africa.* **8.** 351-353. 12 figs.

III. Holdaway, F. G. (1933). **Differential Behaviour of *Lucilia sericata* Meig. and *Lucilia caesar* L. in Natural Environments.**—*J. Anim. Ecol.* **2.** 263-265. 5 tables. [1 ref.]

I. Roberts gives a detailed account of the biology of *Brachymeria fonscolombei* (Dufour), a parasite of the larvae of blowflies in Europe, North America and Asia.

It is most active as a parasite of *Sarcophaga* though it readily parasitises *Synthesiomyia* and *Phormia* and was frequently bred from *Lucilia* and *Calliphora*. *B. fonscolombei* rarely parasitises *Chrysomyia* [*Cochliomyia*] *macellaria* but when it does, both insects usually perish.

II. de Vries describes a trap that can be made cheaply from an iron oil drum (44 gallons size), baling wire, sheet iron and wire gauze. The drum is divided into two unequal portions; in the lower and smaller portion a grid of baling wire is placed for the holding of carrion as a bait – a whole sheep may be used. The upper portion of the drum is supported on legs two inches above the lower and a sheet iron flounce is placed over the opening to exclude light from the trap. The flies, attracted by the bait, enter through this opening under the flounce.

In the upper portion of the trap a shallow wire gauze cone is inserted with the narrow end upwards and through this opening the flies wander upwards towards light which enters through an opening made in the top of the drum and covered with wire gauze.

In the bottom of the lower drum, under the grid, three gallons of 2 per cent. locust poison is placed so that any maggots that may develop in the carrion drop into the poison and are destroyed.

It is suggested that such traps be placed at drinking places and shade where sheep foregather in the heat of the day.

III. Holdaway concludes from trap records that *Lucilia sericata* prefers open habitats and bright weather and *L. caesar* shady habitats and dull weather.

—J. S. Steward.

I. Gordon, H. McL. (1933). **A Method of Establishing Pure Infestations with Adult Trichostrongylids in Sheep.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 151-152. [3 refs.]

II. Belschner, H. G., & Edgar, G. (1933). **Observations on the Treatment of Trichostrongylosis in Young Sheep.**—*Austral. Vet. J.* **9.** 138-149. 14 tables.

III. Edgar, G. (1933). **Some Observations on Trichostrongylosis of Young Sheep.**—*Ibid.* 149-154. [9 refs.]

I. Adult *Ostertagia* spp. and *Haemonchus contortus* were collected from sheep *post mortem*, placed in physiological saline and drenched to young lambs which had been raised under worm-free conditions. In this way pure infestations were set up with *Ostertagia* spp. in three cases and with *H. contortus* in one case. Lambs so infested were used as sources of supply for larvae of the species in question for experimental infestations of other sheep. In one case before giving *Ostertagia* spp. the lamb was given a preliminary drench with sodium bicarbonate which is claimed by Wester to cause closure of the oesophageal groove, thus ensuring direct passage to the abomasum. In the remaining cases the adult parasites in saline were given direct. The fact that these worms had established themselves was shown by the presence of ova in the faeces within a few days. Attempts to establish infestations with *Trichostrongylus* spp. and *Nematodirus* spp. in this way were not successful.

II. A trial was carried out on a property where young sheep suffered a severe check in their growth up to the time they were a year to 15 months old. Some mortality also occurred. *Post-mortem* examination of one sheep at the beginning of the trial revealed heavy infestation with *Trichostrongylus* spp. (chiefly *T. vitrinus*), *Ostertagia* spp. and *Nematodirus* spp. In the trial, 125 six-month-old lambs were divided into five lots which received the following treatments respectively :–1 oz. of a 1 per cent. solution of copper sulphate and mustard ; 1 oz. of a 1 per cent. solution copper sulphate ; 1 c.c. carbon tetrachloride in 4 c.c. liquid paraffin ; 1 oz. of a 1 per cent. solution of copper sulphate and mustard after 48 hours' starvation ; the fifth group were untreated controls. These treatments were repeated four times at intervals of 14 days, then at approximately monthly intervals until a total of nine treatments, from the 6th Oct., 1932, to the 8th May, 1933, had been given. The lambs were weighed at each drenching. The results of the experiment indicate that repeated treatments of young sheep with these drenches had no demonstrable effect on the degree of infestation with the small trichostrongyles as determined by egg and worm counts made at various periods.

The trial has demonstrated the need for reliance on good animal husbandry, and the provision of adequate feed, rather than medicinal treatment in the control of the smaller trichostrongyles in young sheep. It is thought that older sheep do not suffer seriously from the effects of small trichostrongyles.

III. Infestations of young sheep with the smaller trichostrongyles, particularly *Trichostrongylus* spp. (*T. vitrinus*, *T. instabilis* and *T. extenuatus*) is attended by very serious and even fatal results. The outstanding symptoms of trichostrongylosis in young sheep are a stunted appearance accompanied by copious, almost black, diarrhoea, commonly termed " black scours." Anaemia is not a marked symptom, a distinction from haemonchosis. *Post-mortem* examination does not reveal obvious lesions, the marked emaciation being the outstanding observation. There may be ecchymoses in the mucosa of the abomasum and duodenum. The parasites are found with difficulty owing to their small size. *T. vitrinus* appeared to be the commonest species present. Trichostrongylosis appears to be widely distributed, though it is considered that sheep are more likely to become heavily infested on the tableland and coastal areas. Mortalities have been recorded, however, from other parts of New South Wales, such as the Western Plains. The conditions predisposing to heavy infestations are said to be excess rainfall, which favours the free-living stages of the life-cycle, and poor pasture conditions later,

which reduce the resistance of the sheep. Trichostrongylosis is essentially a disease of young sheep. Animals over about one year old seldom suffer. Under natural conditions sheep approaching 18 months old show remarkable improvement and appear to throw off the infestation, subsequently remaining comparatively free from small trichostrongyles. The factors responsible for this, such as an age or acquired immunity, are discussed.—H. McL. Gordon.

IMMUNITY.

Zottner, G. (1934). Possibilité d'obtention d'un antigène alcoolique stable pour le diagnostic des trypanosomiases animales par déviation du complément. [**The Possibility of Obtaining a Stable Alcoholic Antigen for Diagnosis of Trypanosomiasis in Animals by Deviation of Complement**].—*C. R. Soc. Biol. Paris.* **115.** 19-20.

Zottner, G. (1934). Valeur pratique de la déviation du complément par antigène alcoolique stable dans le diagnostic de la dourine. [**The Practical Value of the Deviation of Complement by Stable Alcoholic Antigen in the Diagnosis of *Tryp. equiperdum* Infection (Dourine)**].—*Bull. Soc. Path. exot.* **27.** 159-161. [1 ref.]

Raffel, S. (1934). **Studies in Immunity to Trypanosomes. I. Acquired Immunity in *Trypanosoma equiperdum* Infected Rats. The Reickenberg Reaction.**—*Amer. J. Hyg.* **19.** 416-448. 1 fig., 3 tables, 3 graphs. [43 refs.]

The first two papers deal with the method of preparation of stable antigen for use in the complement-fixation test for trypanosome infection, and the value of this antigen in practice.

White rats are inoculated with *T. equiperdum* or *T. marocanum* and when they show a heavy blood infection they are bled into sodium citrate solution (15 : 1,000) and the mixture centrifuged slowly by hand. When the cells are separated, the supernatant fluid which contains the trypanosomes is centrifuged at great speed for half an hour. The sediment which contains the trypanosomes and a few red cells is washed first in distilled water, and then with physiological saline. After washing and centrifuging, the deposit is freed from fluid as much as possible and then taken up with acetone which is evaporated in an incubator. The residue is made into a suspension 1 cg. of dried trypanosomes to 10 c.c. absolute alcohol. This suspension is filled into a coloured glass vessel which is hermetically sealed and kept in an incubator at 40°C. for 15 days.

For use, the alcohol is evaporated and physiological saline added (five times the quantity of alcohol evaporated). Twelve rats will provide 250 c.c. diluted antigen which is sufficient for rather more than 200 tests.

Forty-two sera were tested for dourine and the results compared with complement-fixation tests made on the same sera using fresh Watson's antigen, and also with formol-gel and Fulton's reaction tests. The alcoholic antigen gave similar results to those obtained with Watson's antigen but has the advantage of stability. Positive readings were not given with the sera of animals in the incubation period. After treatment of infected horses, about half the animals gave negative results with the complement-fixation test.

The non-specific formol-gel and Fulton's reaction tests did not always give the same results as the specific complement-fixation tests.

The third paper records experiments on immunity in rats to the original infecting strain and relapse strains of *T. equiperdum*. The Reickenberg or " thrombocytobarin " reaction was used to distinguish immunity to the original and various

relapse strains of the organism. With heavy infective doses of *T. equiperdum* an acute blood infection was produced in rats with death in three to seven days, but with small infective doses alternate immunity and relapses occurred in the majority of animals with a fatal relapse as the invariable conclusion. Immunity may be produced to the original infecting strain before organisms have appeared in the blood in demonstrable numbers, and, in this case, the first organisms encountered belong to the relapse strain. Similarly, antibodies may be formed during the periods following visible crisis against the relapse strain resulting from that crisis. The antibodies formed are strictly strain specific, and the first relapse strain of the same original infecting strain is the same in different rats.

Investigation of the " thrombocytobarin " antibody, revealed that it was associated with the globulin fraction of the serum and not with the fibrinogen fraction as had been suggested. [See also this *Bull.* **2.** 397].

—U. F. Richardson.

Grudzien, S. (1933). Badania nad wartoscia metody prowokacyjnej Prof. Dr. Panka w rozpoznaniu nosacizny. **[Enquiry into the Value of the Provocative Method of Professor Panek for Diagnosing Glanders]**.—*Przeglad Wet.* **46.** 2-22. 2 tables, 4 charts. [23 refs.] [French summary : abst. from orig.]

In order to demonstrate glanders, Professor Panek administered " morvotensyn," his own preparation, subcutaneously in 1 c.c. doses. "Morvotensyn" is a potent antigen obtained from cultures of *Pfeifferella mallei.* The author carried out his experiments with " morvotensyn " on 20 horses suspected to be infected with glanders. The provocative method revealed six glanders cases ; this was verified also by the blood test and by *post-mortem* examination. Six glandered horses showed a local sore swelling after inoculation with " morvotensyn " ; they also showed lymphangitis, a sudden increase of temperature, a general debility, impaired appetite, sweat, etc. In horses in which active infection had died out " morvotensyn " does not cause a temperature reaction of more than 40°C. and there is local reaction.—K. Szczudlowski (Lwów).

I. Jarosch, R. (1933). Uwagi o wartosci leczniczej antywirusu przeciwropnego. **[Curative Value of Antivirus]**.—*Przeglad Wet.* **46.** 242-246.

II. Wajda, J. (1933). Sklad krwi w przebiegu zolzów i przy stosowaniu przesaczu Besredki. **[Composition of the Blood in the Course of Strangles and the Application of Besredka's Antivirus]**.—*Ibid.* 281-294. 9 tables. [15 refs.]

I. The author applied antivirus in three cases of suppuration in horses and stated that the curative value of this antivirus is exaggerated.

II. Blood examination of nine horses was carried out before and after inoculation either of a broth culture mixture of strangles streptococci or of strangles material and Besredka antivirus. The author stated that injection of *Streptococcus equi* increases the number of the neutrophile leucocytes and diminishes the quantity of eosinophile lymphocytes. Intracutaneous application of antivirus stops the progress of the suppuration and simultaneously increases the number of white and usually of red blood cells.—K. Szczudlowski (Lwów).

Józkiewicz, M. (1933). Obraz krwi konia zdrowego w przebiegu malleinizacji metoda wsródskrónopowiekowa. **[Blood Examination of a Healthy Horse during the Intradermopalpebral Mallein Test]**.—*Przeglad Wet.* **46.** 135-164. 6 tables, 1 chart. [33 refs.] [French summary : abst. from orig.]

A study of the blood picture after applying the intradermopalpebral mallein test to 48 horses. Mallein injected into the skin of the lower eyelid does not provoke appreciable changes in the blood picture. All blood corpuscles invariably keep their shapes and ratios. It does appear that the mallein exercises some irritant effect on the lymphatic system. The age, type, breed and hygienic conditions of the animal seem to have no influence on the mallein test. In healthy horses the mallein reaction never persists beyond the 36th hour after injection. —K. Szczudlowski (Lwów).

DISEASES, GENERAL.

Reichel, J. (1934). **Forage Poisoning as Noted by Leonard Pearson and subsequent Developments.**—*Univ. Pennsylvania Bull. Vet. Exten. Quart.* **34.** No. 54. pp. 1-6. [1 ref.]

A brief review of the history of forage poisoning (botulism) of horses in North America with a reprint of Pearson's original description included in the text. The Kentucky Agricultural Experiment Station proved that an outbreak of a similar type, occurring some years later, was due to botulism.

Reference is also made to the virus diseases, Borna disease and equine encephalomyelitis.—J. E.

I. Wagener, K. (1933). Stand und Ziel der Erforschung und Bekämpfung der Zuchtkrankheiten des Rindes. [**Position and Aims in Research Work in and Control of Breeding Diseases of Cattle**].—*Berl. tierärztl. Wschr.* **49.** 486-489. [4 refs.]

II. Erismann, H., & Saxer, E. (1933). Zur Diagnose der Endometritis catarrhalis des Rindes. [**Diagnosis of Catarrhal Endometritis in Cattle**].—*Schweiz. Arch. Tierhlk.* **75.** 534-552. 1 fig., 2 tables. [20 refs.]

III. Chapron, H. (1934). Sur la physiologie et la pathologie des ligaments larges chez les femelles bovines. [**Physiology and Pathology of the Broad Uterine Ligament of Cows**].—*Rev. Path. comp.* **34.** 264-270. [13 refs.]

I. The author refers to contagious abortion as the principal cause of breeding disorders in cattle and discusses methods of combating the disease. He believes that hygiene and nutrition play a part in the incidence of the disease.

II. The importance of endometritis as a cause of sterility in cattle is stressed by the authors ; they found that careful *post-mortem* examination revealed the condition in 68 out of 202 cows. Of these, three were proved to be tuberculous in origin. The pathological changes were limited to the uterine mucosa and in no case was the ovary involved.

III. The normal function of the uterine broad ligaments is to support the uterus and to transport it towards the vagina at the time of parturition. Failure to contract may result in uterine inertia or, on the other hand, excessive contraction may cause torsion of the uterus.—S. J. Edwards.

Adsersen, V. (1933). Om Aarsagsforholdene ved Dødelighed blandt Pattegrise. [**Aetiology of Diseases of Suckling Pigs**].—*Med. Stat. Vet. Serumlab. Copenhagen.* No. 134. pp. 20. and *4. Nord. Vet.-mötet., Helsingfors, 1933.* 925-946. 4 figs., 1 table. [12 refs.] [German summary : abst. from orig.]

The author illustrates the great bearing on morbidity and mortality of anaemia occurring during the first weeks of life and the important results that can be attained by preventing its occurrence [see this *Bull.* **3.** 40].

On *post-mortem* examinations of dead suckling pigs, degeneration and dilatation of the heart with corresponding signs of venous congestion are found very frequently. In certain cases they are especially conspicuous with serous or sanguinary exudate in the pericardium, frequently best characterized as haemopericardium. Like other workers, the author has observed these symptoms as occurring frequently in certain litters of pigs. He has, therefore, performed inbreeding experiments with surviving pigs of such a litter, and a survey of the results is given in a table. The results so far arrived at, support the supposition that an inheritable element plays a not immaterial part in the development of these morbid conditions.

—H. C. Bendixen (Copenhagen).

Lerche, & Fritsche, K. (1933). Geflügellähme. [**Fowl Paralysis**].—*Zschr. Infektkr. Haust.* **43.** 185-210. 10 figs. [27 refs.]

The incidence of fowl paralysis in Germany has been increasing during recent years and the authors of this paper have made a study of certain outbreaks. Their observations have shown that, on the majority of farms, the disease first appeared in young birds introduced from outside sources and that in the following year paralysis appeared amongst the home-bred stock.

Five to six months is the most usual age for hens to be attacked, but paralysis has been observed in birds eight weeks old and upwards. All breeds appear to be susceptible and the disease is more commonly met with in the late summer, being at its height in August. Affected birds usually live for several weeks, but death may ensue more rapidly. In some cases recovery takes place. *Post-mortem* examinations have shown that catarrhal inflammation of the mucous membrane of the small intestine, which may or may not be associated with parasites, is usually present. There is muscular atrophy but the internal organs appear normal. The degree of infiltration of the nerves varies considerably and nerve sections should be examined histologically before a diagnosis is made.—J. R. M. Innes.

Feldman, W. H., & Olson, C., (Jr.) (1933). **The Pathology of Spontaneous Leukosis of Chickens.**—*J. Amer. Vet. Med. Ass.* **82.** 875-900. 7 figs., 1 table. [25 refs.]

The authors subdivide this condition into :—(1) myeloid leucosis, in which there is a neoplastic-like hyperplasia of the granuloblastic elements of the bone-marrow, with subsequent entry of immature myeloblastic cells into the blood stream and (2) erythroleucosis, in which there is a vigorous proliferation of erythroblastic cells, and the appearance in the blood stream of excessive numbers of haemoglobin-free precursors of erythrocytes.

Chronic and acute forms of the disease are encountered. There is anaemia, general debility, muscular weakness and dullness and, in the chronic form, marked loss in body weight. A diagnosis can only be made with certainty by an examination of blood smears. Lesions are commonly found in the liver, spleen, bone-marrow, kidneys and intestine.

There is no evidence that the disease can be transmitted to healthy chickens by their cohabitation with affected chickens, but the authors were able to reproduce the disease in susceptible birds by the intravenous injection of 0·5 c.c. of whole blood or suspensions of liver, spleen or bone-marrow obtained from diseased birds.

—J. R. M. Innes.

Baumgärtner, H. (1933). Sogenannter Basalzellenkrebs der Haut bei Hund und Katze. [**Basal Cell Cancer of the Skin of Dogs and Cats**].—*Arch. wiss. prakt. Tierhlk.* **66.** 344-350. 2 figs. [5 refs.]

Tumours of the epithelium from two dogs and one cat are described. These showed great morphological divergence from the usual neoplasms of the skin. In spite of extensive growth at the circumference, the tumour cells remained embryonic in type and differentiation was not marked. The cells of the epithelial part resembled those found in the stratum malphighii ; cornification was also observed. The tumours appeared to be benign.—J. R. M. Innes.

Gowen, J. W., & Schott, R. G. (1933). **Genetic Constitution in Mice as Differentiated by Two Diseases, Pseudorabies and Mouse Typhoid.**—*Amer. J. Hyg.* **18.** 674-687. 2 figs., 3 tables. [24 refs.]

This article reports the result of a study of the part played by heredity in the ability of an animal to resist infection with a virus. Five distinct mouse strains, which had been selected either by mating brothers and sisters for several generations or on the basis of survival to *Bact. aertrycke* infection, were available. The pseudorabies [Aujeszky's disease] virus (Iowa strain), obtained from infective rabbit brains, was inoculated into the mice intraperitoneally in a dose of 20 mg. The comparative rates of survival in these strains of mice were, 8·4 ± 1·4 ; 11·5 ± 3·0 ; 22·6 ± 5·1 ; 52·2 ± 2·5, and 55·4 ± 7·9 respectively.

The genetic nature of the resistance was further illustrated by crossing two of the lines and thereby obtaining an intermediate level of percentage survival.

Comparative experiments on resistance to two separate diseases showed that a genetic complex, which led to the survival of one strain when exposed to one infective agent (Aujeszky's disease), favoured susceptibility to another agent (*Bact. aertrycke*).—R. E. Glover.

Åkerblom, E. (1934). Ueber die Aetiologie und Pathogenese der Futterrehe beim Pferde. [**Aetiology and Pathogenesis of Nutritional Laminitis in Horses**].—*Skand. Arch. Physiol.* **68.** Suppl. pp. 168. 14 figs., 8 plates, 2 diagrams, 38 tables. [5 pp. refs.] [Orig. in German].

The publication is in the nature of a monograph on laminitis of dietetic origin [" Futterrehe " equivalent to " nutritional founder "] in horses, a condition of obscure aetiology but commonly associated with sudden change of feeding, particularly to large rations of grain or protein-rich food.

Chapters I and II discuss the history of " founder," the various theories put forward to explain pathogenesis and the main facts on symptomatology and treatment. Chapters III and IV deal with negative experiments with moulds. Chapter V discusses the possibility of toxin formation from food-stuffs and Chapter VI considers the biochemistry and pharmacology of certain physiologically important amines, particularly those produced by bacterial putrefaction of proteins. Chapter VII deals with the experimental production of symptoms of laminitis by injection of histamine, and of products isolated from intestinal contents, and by oral administration of cultures of histamine forming bacteria (mainly strains of *Bact. coli*) followed by feeding on rye and barley. Chapters IX and X discuss the anatomy and physiology of the hoof, predisposing factors for the " histamine effect," and the flora and physiology of the digestive tract of the horse.

The author inclines to an " auto-intoxication theory " for " founder," the effects being produced, under certain conditions, by histamine derived from bacterial decarboxylation of the amino acid histidine in the food protein.—H. H. Green.

I. Hart, G. H., & Guilbert, H. R. (1933). **Vitamin-A Deficiency as Related to Reproduction in Range Cattle.**—*Univ. California Coll. Agric. Expt. Sta. Bull.* No. 560. pp. 30. 5 figs. [51 refs.]

II. Chatelain, M. P. (1933). Les Vitamines A dans l'Alimentation des Herbivores. **[Vitamin A in Food for Herbivora].**—*Bull. Soc. Sci. vét. Lyon.* **36.** 223-236.

I. Vitamin A deficiency was diagnosed in cattle under natural conditions and its various manifestations in animals of different ages studied. The symptoms asserted to be those of vitamin A deficiency in cattle were as follows :– (1) birth of dead or weak calves, with or without eye lesions ; (2) severe diarrhoea in new-born calves and (3) eye lesions, particularly in immature animals. Vitamin A deficiency produced the symptoms more quickly in conjunction with an adequate fat production ration than with one which was only at the maintenance level or under. It is recommended that the best practical source of vitamin A for livestock feeding is green feed or hay.

II. A wasting disease of mules and horses is reported. The emaciation takes place despite the animals having an adequate ration of protein, fat and carbohydrate. Improvement was shown immediately after subcutaneous injections of :– (1) a cabbage preparation ; (2) cod liver oil and (3) egg yolk. It is therefore suggested that the wasting condition is due to vitamin A deficiency and that the action of the vitamin A in the above injections was to increase the assimilation of the carbohydrates of the ration.—James Stewart.

POISONS AND POISONING.

I. Dunn, J. T. (1933). **An Analyst's Random Jottings on Poisons.**—*Vet. Rec.* **13.** 1217-1220.

II. Beaudette, F. R., Hudson, C. B., & Weber, A. L. (1933). **Phosphorous Poisoning in Poultry.**—*North Amer. Vet.* **14.** No. 7. 39-42. [2 refs. on p. 51].

III. Husband, A. D., & Duguid, J. F. (1934). **The Toxicity to Grazing Animals of Grass Sprayed with a Solution of Sodium Arsenite.** — *Rhodesia Agric. J.* **31.** 25-39. 2 graphs. [10 refs.]

I. The author commences by defining a poison and then describes very simply the analyst's methods of searching for poisons in the animal body. He suggests how the medical man or veterinary surgeon and the analyst can be of mutual assistance to one another and so often arrive at a conclusion with little waste of material. He then goes on to quote from his own experience cases of " chronic " poisoning by phenols from industrial effluents, and by the contamination of pastures by lead and arsenic from industrial processes.

II. The authors record 15 outbreaks of phosphorus poisoning in poultry and one case in a cat. In 14 of the cases examined, a distinct odour of phosphorus was observed from the crop or gizzard, or from both. The *post-mortem* findings were :– the crop usually containing fluid with a distinct odour of phosphorus, which was usually more pronounced in the gizzard contents ; the intestinal mucosa reddened and the mesenteric vessels usually engorged ; and the liver usually friable and the kidneys congested. No microscopic findings are recorded.

III. The object of the investigation was to find out whether the spraying of pastures with dilute solutions of sodium arsenite, used to destroy locusts in the hopper stage, would render the pastures toxic to grazing stock. Eight oxen of various ages were dosed with locust poison powder of known arsenious oxide content, and it was found that the minimum toxic dose was in the neighbourhood of 30 grains per ox.

Long and dense grass was lightly sprayed with sodium arsenite solution. Three experiments were carried out, with the following results :–

(a) It was found that grass lightly sprayed with sodium arsenite (about 8 lb. per acre) forms a great potential danger to stock, but this danger is removed when the grass is burned, as cattle would need to consume about 1 lb. of ash to ingest a toxic dose of arsenic.

(b) It was found that there is a progressive decrease from month to month in the arsenic content of grass sprayed with sodium arsenite solution irrespective of rainfall.

(c) Even grass sprayed with sodium arsenite to the extent of 1·5 lb. per acre was found to be toxic to cattle.

Experiments were also carried out on the distribution of arsenic in the organs of oxen poisoned with sodium arsenite. It was found when a large dose of sodium arsenite was ingested and death took place quickly, arsenic could be found in an estimable quantity in all the organs. When an interval of 96 hours intervened between ingestion and death, the quantity of arsenic found was less and none could be found in the intestines. It is suggested that more reliable information as to whether arsenic has been absorbed can be obtained from an analysis of the omasum or kidney than from the abomasum.—G. D. Shearer.

I. Doak, B. W. (1933). **A Chemical Method for the Determination of Type in White Clover.**—*New Zealand J. Sci. & Technol.* **14.** 359-365. 2 figs., 3 tables, 1 chart. [5 refs.]

II. Rigg, T., Askew, H. O., & Kidson, E. B. (1933). **Occurrence of Cyanogenetic Glucosides in Nelson Pasture Plants.**—*Ibid.* **15.** 222-227. 2 tables. [29 refs.]

III. Askew, H. O. (1933). **Determination of Hydrocyanic Acid in White Clover.**—*Ibid.* 227-233. 5 tables. [1 ref.]

I. Knowing that New Zealand white clover contains a quantity of hydrocyanic acid, the author conceived the idea that the type of the plant might be recognized by the amount found in each. He gives his method of analysis and shows that there is a definitely higher quantity of HCN as a glucoside in the better producing plants. No free HCN occurs in the plants. In mother seed up to 0·013 per cent. was found. Sheep were grazed on the high yielding white clover plants without any bad effect.

II. Analyses of legumes and pasture grasses from the Nelson district were carried out for HCN content. Amounts found have been tabulated. White clover contained 0·0016 per cent. to 0·0124 per cent., while red clover, alsyke, subterranean clover and lotus major gave about the same quantity on all the grasses analysed—0·0001 to 0·0005 per cent. Lucerne gave 0·0015 per cent.

These authors consider that, on Hindmarsh's figures, if white clover were fed and the full glucoside content absorbed quickly, the plant would prove poisonous. No cases of poisoning, however, have ever been encountered.

III. A standardized method of determining HCN in plants was required and the author worked on New Zealand white clover. A detailed description is given of the methods employed. Highest titration figures were obtained by grinding the fresh clover and steeping in water for 24 hours at room temperature or at 45°C. for five hours. Addition of acid to a concentration of more than N/1,000 decreases the yield of HCN, but sodium hydroxide up to N/100 does not reduce the amount obtained in distillation. Cool storage up to six days did not decrease the yield.

There was no fixation of HCN in an inactive form in the presence of ferrous sulphate, limonite or soil, except in the presence of dilute sodium hydroxide.

—C. S. M. Hopkirk.

PHYSIOLOGY.

I. Marshall, E. K. (Jr.) (1934). **The Comparative Physiology of the Kidney in Relation to Theories of Renal Secretion.**—*Physiol. Rev.* **14.** 133-159. 1 fig., 2 tables. [90 refs.]

II. Boddie, G. F. (1933). **An Investigation of the Urine of Normal Dairy Cows.**—*Vet. Rec.* **13.** 1128-1133. 1 table, 4 graphs. [6 refs.]

I. It would appear that glomerular filtration, tubular reabsorption, and tubular secretion all probably occur to some extent in all vertebrate kidneys. From a comparative study of the morphology and function of the renal unit in vertebrates, the mammalian renal tubule may be considered as being made up of five morphologically distinct units, the renal capsule, the proximal convoluted tubule with medullary segment, the thin part of Henle's loop lined with pavement epithelium, the distal convoluted tubule, and the initial collecting tubule.

II. 110 samples of normal cows' urine have been examined. The specific gravity was found to vary within wide limits and the reaction in practically all cases was faintly alkaline. The presence of albumin, bile pigment, bile salts and blood could not be demonstrated, but in 58 per cent. of the cases, sugar, probably lactose, was present. Small amounts of indican, creatinine, and glycuronic acid were constantly present, and 25 per cent. of the specimens contained mucus deposits. A number of apparently healthy pregnant or lactating cows had an appreciable amount of acetone in their urine ; this was not found in the urine of stock kept on a maintenance ration only. The amount of urea present varied considerably, being lowest in the winter and highest in the late spring or early summer when the cows were first turned out to graze.—J. A. Nicholson.

I. Egehøj, J. (1933). Bovens Lymfekarsystem hos Kvaeg. [**The Lymphatic System of the Shoulder of the Ox**].—*Maanedsskr. Dyrl.* **45.** 145-151. 1 fig. [A *verbatim* translation appeared in *Deuts. tierärztl. Wschr.* **42.** 77-79].

II. Egehøj, J. (1934). Interlymfoglandulaere Lymfekarforbindelser paa Baglemmet hos Kvaeg og Svin. [**The Lymphatic System of the Hind Limb of Cattle and Swine**].—*Ibid.* 546-560. [5 refs.]

I. Intravital staining with pyrrole blue was employed and considerable deviations from Baum's findings were observed as regards the distribution of lymphatics to the groups of lymphatic glands of the shoulder of the ox. The author emphasizes that these deviations must be examined further before their importance can be precisely defined.

II. The author employed the injection technique of Iossifow on newly-killed animals. He has frequently found deviations from Baum's classical statements. They manifest themselves by the fact that the vasa efferentia from one gland anastomose with one or more groups of lymphatic glands other than those mentioned by Baum, or by the fact that the vasa efferentia do not drain into a particular gland, as described by Baum. In the main features the findings were, however, in accordance with Baum's descriptions.

—H. C. Bendixen (Copenhagen).

Zimmermann, G. (1933). Ueber den Waldeyerschen lymphatischen Rachenring. [**Lymphoid Tissue of the Pharynx of Domesticated Animals**].—*Arch. wiss. prakt. Tierhlk.* **67.** 141-153. 6 figs. [9 refs.]

In the domesticated animals the pharyngeal lymphatic ring is incomplete and smaller and larger tonsils can be distinguished. From a study of the arrangement of these tissues, the author divides the tonsils into three main and four subsidiary structures. These show minor differences in the various animal species, but the general arrangement appears to be on the same plan in most mammals.

The tonsils arise from epithelium which becomes infiltrated by lymphatic cells towards the end of intra-uterine life. During later life the tonsils undergo further development and it is not always possible to distinguish physiological from pathological changes.—J. A. Nicholson.

Ivy, A. C. (1934). **The Physiology of the Gall Bladder.**—*Physiol. Rev.* **14.** 1-102. [557 refs.]

Recent work has made it certain that the gall bladder action resembles that of the intestines, since it possesses powers of absorption and secretion and motor activity. Absorption is confined to the abstraction of water and of certain inorganic salts. The secretion is mucoid in character and contains no enzymes. Atropine and nicotine relax the gall bladder, and pilocarpine and histamine cause a rise in the intra-gall bladder pressure. Pituitrin causes evacuation of the gall bladder in the dog and in human beings. All available evidence strongly supports the classical conception that the gall bladder stores much of the bile formed during the interdigestive period, although it is as yet impossible to explain the presence, or absence, of the gall bladder in closely related species. There may be more significance in the storage and concentration of the bile by the gall bladder than is at present appreciated and this should stimulate further investigation in animals, such as the horse, which do not possess a gall bladder.—J. A. Nicholson.

I. Franklin, M. C. (1933). **The Importance of Assessing the Effects of Salivary Secretion in the Interpretation of the Results of Metabolism and Mineral Balance Experiments.**—*Third Rep. Direct. Inst. Anim. Path. Univ. Cambridge. 1932-1933.* pp. 135-155. 6 tables, 1 appendix. [8 refs.]

II. Brooke, R. O., Smith, A. H., & Smith, P. K. (1934). **Inorganic Salts in Nutrition. VII. Change in Composition of Bone of Rats on a Diet Poor in Inorganic Constituents.**—*J. Biol. Chem.* **104.** 141-148. 2 tables. [20 refs.]

III. Delaplane, G. F. (1934). **Some of the Tissue Changes in Poultry Resulting from the Ingestion of Sodium Bicarbonate.**—*Vet. Alumni Quart. Ohio Univ.* **21.** 149-166. [34 refs.]

I. Experimental evidence is produced to show the disturbing effects which may be caused by the secretions of the salivary and intestinal glands upon metabolism experiments. These may affect both the mineral and the nitrogen balances and consequently upset the values found for the digestibility co-efficients. It is suggested that the results of previous workers may require to be revised.

II. Nine experimental and 18 control animals were used. The fed animals had an unrestricted ration of a diet poor in inorganic salts. The control animals received diets comparable in quality and calorie intake, but with a sufficiency of minerals. The feeding lasted for 90 days. The dried and defatted, but unignited, femurs were examined for Ca, PO_4 and CO_3. The experimental animals showed a reduction in all these constituents, and an increase in the $Ca_3(PO_4)_2/CaCO_3$ ratio. The ratio of non-carbonate Ca to P was normal.

III. A comprehensive review is given of the literature bearing upon the aetiology and pathology of gout in poultry. The author reports an experiment upon 73 chickens and five ducks. It was found that the continued ingestion of sodium bicarbonate produced lesions similar to those seen in gout. Chalk, sodium sulphate,

potassium bicarbonate, sodium hydroxide and sodium chloride had no such effect. [The amounts administered were not strictly comparable].—HENRY DRYERRE.

I. SYKES, P. H. (1934). **An Iodine Survey of New Zealand Live-Stock. Part II.** —*Trans. Roy. Soc. New Zealand.* **64.** 17-34. 7 figs., 7 tables. [12 refs.]

II. CUNNINGHAM, I. J. (1934). **Magnesium and Calcium in the Blood of Sheep and Cows.**—*New Zealand J. Sci. & Technol.* **15.** 414-422. 1 fig., 4 tables. [8 refs.]

I. This paper deals with the Wairarapa district and the results of analyses of thyroid glands have been considered with reference to four geological types of soil.

The average percentage of iodine per fresh gland weight in animals on the different soil types was :- limestone, 0·94, greywacke, 0·82, papa, 0·72 and alluvium 0·47.

Feeding lambs on iodized licks increased the iodine content of the thyroid glands.

II. In continuation of work carried out on grass tetany of dairy cows and the magnesium content of the blood, sheep were drenched with magnesium sulphate, the result being a rise of the blood Mg. Dairy cows were given Mg as a 0·5 per cent. solution of $MgSO_4$ in drinking water, or as dolomite sprinkled on ensilage, both methods bringing about a rise in blood Mg.

The high level of Mg was maintained for 14 days following discontinuance of feeding in cows. Dolomite gave better results in raising blood Mg than did the $MgSO_4$.—C. S. M. HOPKIRK.

I. PESKETT, G. L. (1933). **The Effect of Salts on Cell Permeability as shown by Studies of Milk Secretion.**—*Proc. Roy. Soc. London. Ser. B.* **114.** 167-180. 3 figs., 5 tables. [18 refs.]

II. DHINGRA, D. R. (1934). **The Component Fatty Acids and Glycerides of the Milk-Fat of Indian Camels.**—*Biochem. J.* **28.** 73-78. 6 tables. [5 refs.]

I. Analyses of blood samples, taken from cows one to three hours after the morning milking, and of samples of milk, showed that there was a correlation between the ratio of sodium to diffusible calcium in the blood and that of solids-not-fat to fat in the milk. Variations in the proportions of these salts in the blood may influence the composition of the milk by affecting the relative permeability to the lipoid and non-lipoid of the mammary cell-membranes.

II. A comparison between the fatty acids of the milk-fat of the camel and the cow shows that the Reichert-Meissl and Kirschner values are lower and the saponification equivalent higher in the former than in the latter, and that camel milk-fat contains definitely less butyric acid than other milk-fats. There is no reason, however, why camel milk-fat should not be used as a substitute for cow or buffalo milk-fats.—J. A. NICHOLSON.

GRANT, R. (1933). **The Pigmentation of the Uterine Mucosa in the Ewe.**— *Vet. J.* **89.** 271-274. 3 figs. on 1 plate. [7 refs.]

An examination of more than 2,000 uteri, from ewes killed in all stages of the reproductive cycle, revealed the fact that pigmentation of the cotyledonary areas of the mucosa was present in about 80 per cent. of the subjects examined. The pigment gave reactions typical of melanin and is not of haematogenous origin. The melanoblasts appear in the uterus during foetal development. During pregnancy the pigment cells are largely broken up and the pigment is engulfed by the phagocytic cells of the foetal trophoblast. The pigment does not appear to be of any physiological significance.—J. R. M. INNES.

I. Quinlan, J., Maré, G. S., & Roux, L. L. (1933). **A Study of the Duration of Motility of Spermatozoa in the Different Divisions of the Reproductive Tract of the Merino Ewe.**—*Onderstepoort J. Vet. Sci. & Anim. Indust.* **1.** 135-145. 2 tables. [16 refs.]

II. McKenzie, F. F., & Phillips, R. W. (1934). **Measuring Fertility in the Ram.**—*J. Amer. Vet. Med. Ass.* **84.** 189-202. 6 figs., 2 tables. [3 refs.]

I. The authors have previously shown [this *Bull.* **4.** 132.] that spermatozoa survive up to 48 hours in the cervix of the ewe, and in this paper they determined the length of survival of spermatozoa introduced into other portions of the female reproductive tract. This was accomplished by clamping off various parts of the tract in the anaesthetized ewe, and introducing into these portions spermatozoa collected in sterile pipettes. After a given time the animals were killed and the spermatozoa examined for motility. It was found that motility was lost after 12 hours in the vagina, and also after 12 hours in the lumen of the apex of the uterine horn. In the Fallopian tubes motility was lost in a few hours. It appears, therefore, that the cervix acts as a depot for spermatozoa, and that there is a constant issue of actively motile spermatozoa from this structure to the upper portions of the reproductive tract.

II. The authors have attempted to assess the fertility of rams by the examination of their semen. Semen was collected from the vaginas of ewes, smears made and stained with carbolfuchsin. Rams showing more than 140 abnormal spermatozoa per 1,000 are probably of reduced fertility, provided that the sample of semen has not been taken after a prolonged period of rest. Rams in high condition have a great number of abnormal spermatozoa, also, if the scrotum cannot maintain the testicles at an optimum temperature the semen may be unfavourably affected.

—J. A. Nicholson.

I. Parkes, A. S. (1934). **Coördination of the Reproductive Processes.**—*Lancet.* **226.** 557-563. [The Sidney Ringer Lecture in February, 1934, delivered at University College Hospital, London].

II. Collin, R., & Drouet, P. L. (1934). La préhypophyse du mouton et la réaction des mélanophores. [**Anterior Lobe of the Pituitary Gland of the Sheep and the Reaction of Melanophores**].—*C. R. Soc. Biol. Paris.* **115.** 161. [2 refs.]

III. Lenkeit, W. (1933). Die Plazenta als innersekretorisches Organ. [**Placenta as an Organ of Internal Secretion**].—*Berl. tierärztl. Wschr.* **49.** 469-472. [45 refs.] [Lecture delivered before the Berlin Veterinary Association on January 9th, 1933].

I. The nervous system plays a large part in the control of the male sexual organs and it is only comparatively recently that active testicular extracts have been prepared. In the female, however, the co-ordination of the reproductive processes is largely accomplished by the action of hormones. Oestrin has now been isolated from several sources, the most recent being the urine of the stallion which appears to excrete about 1 g. per week. The clinical use of oestrin is limited to producing initial development of infantile uteri. On the other hand, previous sensitization of the uterus with oestrin followed by injections of progestin (the corpus luteum hormone) will produce a normal uterine cycle in ovariectomized women. Following hypophysectomy, regression of the sexual organs to the immature state takes place both in male and female animals, and injections of anterior pituitary extracts produce ovulation during the oestrum of the female rabbit. Much work still remains to be accomplished before it is possible to restore the normal ovarian cycle by the use of gonadotropic substances.

II. Fragments of the anterior lobe of the pituitary body of the sheep transplanted into frogs (*Rana temporaria*) very rapidly produce an intense darkening of the skin due to the expansion of melanophores.

III. Recent work has indicated that the placenta becomes an active structure during pregnancy and that it assists in ovarian function. The active substance found in placental extracts is identical with oestrin ; cholin is also found in placental extracts but its physiological significance, if any, is not yet clear. Strong evidence exists that, in the human subject, the placenta itself can elaborate oestrin and such may be the case in the mare, since the oestrin content of the blood of this animal does not increase until the third month of pregnancy, at which period the placenta becomes fully developed for the first time.—J. A. Nicholson.

I. Hill, Margaret, & Parkes, A. S. (1933). **Studies on the Hypophysectomized Ferret. VI. Comparison of the Response to Oestrin of Anoestrus, Ovariectomized and Hypophysectomized Ferrets.**—*Proc. Roy. Soc. London. Ser. B.* **113.** 541-544. 13 figs. on 3 plates, 3 tables. [3 refs.]

II. Blickenstaff, P. H. (1934). **Some Studies on the Hypophysis Cerebri of Cattle.**—*Vet. Alumni Quart. Ohio Univ.* **21.** 132-148. 7 tables. [20 refs.]

I. Subcutaneous injections of trihydroxy-oestrin produced essentially similar responses in the three types of anoestrous ferrets used in these experiments. The injections never produced the full oestral condition.

II. An attempt has been made to correlate histological and morphological variations in the pituitary gland with pathological conditions of the ovary and uterine mucosa. For this purpose specimens of these organs were collected from 84 animals which were divided into three groups :–(a) non-pregnant cows slaughtered because of sterility ; (b) pregnant cows and (c) steers and bulls. It was found that in group A the average weight of the pituitary glands was definitely greater than that of groups B and C, moreover, there was a wide variation in the individual weights within group A which was not apparent in groups B and C. Microscopical examination showed that the most frequent lesion of the pituitary was that of colloid degeneration. This was seen in all the groups. Hypertrophy of the connective tissue of the pars anterior was also noted. This was most frequent in glands from sterile cows. Cystic conditions of the ovaries appeared with about equal frequency in groups A and B, but there appeared to be a slight correlation between colloid degeneration and hypertrophy of the pituitary with degeneration of the uterine epithelium.—J. A. Nicholson.

I. Evans, H. M., Simpson, Miriam E.. & Austin, P. R. (1933). **Further Studies on the Hypophyseal Substance giving Increased Gonadotropic Effects when Combined with Prolan.**—*J. Exp. Med.* **58.** 545-559. 7 tables, 2 charts. [11 refs.]

II. Krizenecky, J. (1933). Ein Fall von Regeneration des Hodengewebes an der Stelle des entfernten Ovariums bei einer Perlhenne. [**Regeneration of Testis in Place of a Removed Ovary in a Guinea Fowl**].—*Arch. wiss. prakt. Tierhlk.* **67.** 84-90. 2 figs., 1 table. [19 refs.]

III. Schrire, I., & Zwarenstein, H. (1934). **The Influence of the Gonads on Protein Metabolism. IV. The Effect of Ovariectomy and of Injections of Gonadal and Anterior Pituitary Extracts on Urinary Creatinine in Female Rabbits.**—*Biochem. J.* **28.** 356-359. 5 tables. [8 refs.]

I. The authors have isolated a substance from the anterior pituitary which greatly increases the gonadotropic effect of prolan and which has definite gonadotropic properties itself. These properties were demonstrated by injecting the

substance into normal young animals and noting the increase in weight and vascularity of the ovaries at definite periods after the injections. When the injections were continued for a period of six days the development produced in the ovaries was maintained. An increase in the number of follicles was also noted. Attempts to purify the substance by precipitation and by digestion with trypsin and crepsin have been made.

II. The author performed ovariectomy on five 5-month-old guinea fowls. In one case, 138 days after operation a structure, which on histological examination was seen to be composed of testicular tissue, was found in the place of the removed ovary. Seminiferous tubules containing spermatocytes and spermatozoa were present. The regenerated structure had little or no effect on the appearance of the bird.

III. Castration in male and ovariectomy in female rabbits is followed after some months by an increase in the excretion of urinary creatinine. Injections of ovarian extracts reduce the high urinary creatinine seen after ovariectomy, whereas injections of the anterior lobe of the pituitary have no effect. Injections of the latter substance, however, increase the excretion of urinary creatinine in normal female rabbits.—J. A. Nicholson.

TECHNIQUE.

Fraser, A. H. H., Godden, W., & Auchinachie, D. W. (1934). **On Methods of Determining the Degree of Calcium Deficiency of Sheep.**—*Biochem. J.* **28.** 157-161. 2 figs., 3 tables. [2 refs.]

Four groups of five sheep were fed over a period of seven months. All groups had a basic diet deficient in calcium. One of the groups had nothing extra, the other three groups received in addition respectively, chalk, cod liver oil and chalk plus cod liver oil. Calcium and phosphorus balance determinations were made on one sheep from each group. The blood sera of all the sheep were analysed. The effect on growth was greater when chalk plus cod liver oil was given than with either alone. This was partly due to increased appetite. Ca equilibrium was obtained even on the basic diet alone. Chalk raised the Ca, and lowered the P retention. Cod liver oil raised both. Blood determinations showed that a Ca balance could be obtained with a serum Ca of half the normal value. It is concluded that the growth rate and clinical observation are the best methods of determining the effects of supplements added to a Ca-deficient ration. Blood analyses or balance determinations alone are not satisfactory.—Henry Dryerre.

von Höne. (1934). Die Kastration von Kühen mit elastischer Ligatur. **[Castration of Cows by Elastic Ligature].**—*Tierärztl. Rdsch.* **40.** 71-74. 5 figs.

The author's experience in the ovariectomy of cows, performed as treatment for nymphomania, to prolong lactation or to facilitate fattening.

The operation is performed without an anaesthetic [prohibited by law in Great Britain] on the standing animal, the approach for laparotomy being *per vaginam*. The author's modification of the Derby castration rubber band ligature is employed to effect atrophy of the ovary. The special instrument used is illustrated.—J. E.

MISCELLANEOUS.

Commonwealth of Australia. (1933). **Register of Agricultural Research in Progress in Australia.** pp. 239. Melbourne: H. J. Green, Govt. Printer. [fcp].

This publication issued by the Council for Scientific and Industrial Research, gives a concise account of all agricultural research work recently concluded or in progress in the Commonwealth.

Veterinary research is dealt with in pages 170-213, information on each problem being set out under object, procedure, department, investigators, location and results, with the references to the literature arising from the work.—J. E.

—. (1933). **The F.D. McMaster Animal Health Laboratory—Field Area at "Hinchinbrook."** *—J. Sci. & Indust. Res. Australia.* **6.** 214-215.

A note dealing with the establishment of a field station for the McMaster Animal Health Laboratory. Experiments in progress on the station deal with the demonstration of the effects of light, medium and heavy parasitic infestation on young lambs, as shown by wool growth and body weight. The possibility of lambs being infected with caseous lymphadenitis is under investigation, while a further experiment has been designed to throw light on the importance of inheritance upon wool and mutton character in sheep. In the latter experiment 100 Merino ewes of the original Macarthur strain are being crossed with Border-Leicester rams.—I. Clunies Ross.

Davies, W. (1933). **The Grasslands of Australia and Some of Their Problems : A Report upon the Dairy Pastures.**—*Council Sci. & Indust. Res. Australia.* Pamph. No. 39. pp. 36.

This is a report on Australian pastures made by the author after a year's tour. Attention has been mainly focussed on the good rainfall areas suitable for dairying.

The best grasses and clovers, and their place in Australian pastures, are discussed at some length. The importance of strain is emphasized. In dealing with soil fertility it is pointed out that the aim of manuring is to establish and maintain a good pasture of uniform botanical composition, rather than to promote violent floristic changes as often happens when phosphates are applied to Australian soils. The importance of proper management of grasslands is emphasized and the greater value of short, young pastures as compared with rank growth is explained. The pamphlet concludes with suggestions for research work in this field.—W. I. B. Beveridge.

Gilruth, J. A. (1933). **Pests and Natural Enemies.**—*Austral. Vet. J.* **9.** 110-111,

The introduction into Australia of new forms of life, both animal and plant have, in certain instances, so upset the natural balance of species that several have become very serious pests. While one of these, prickly pear, is now being successfully controlled biologically as the result of scientific investigation, another equally serious one, the rabbit, still causes grave economic losses.

This paper is a plea for the thorough, systematic investigation of the natural enemies and habits of rabbits.—W. I. B. Beveridge.

OFFICIAL AND OTHER REPORTS.

Colony and Protectorate of Kenya. (1933). **Annual Report of the Deputy Director (Animal Industry) and Chief Veterinary Officer for 1932.** [Brassey-Edwards, H. H.]—*Ann. Rep. Dept. Agric. Kenya. 1932.* pp. 184-270. 36 tables. Nairobi : Govt. Printer. [8vo] [5s.]

There were no retrenchments in staff during the year. The Chief Veterinary Officer was on leave from 5th March to 20th October and, during his absence,

first Mr. J. WALKER, Chief Veterinary Research Officer, and then Mr. R. DAUBNEY, Acting Deputy Director (Animal Industry), officiated as C.V.O.

During the present period of world economic depression the livestock industries in Kenya have been faced with grave difficulties, which have been aggravated by drought and invasions of locusts. Despite these handicaps, produce of animal origin continues to increase, both in amount and net value. While the position in the native reserves remains much as it was, there is evidence of a marked desire on the part of European agriculturalists to enter mixed farming with dairying as its main feature. It is considered that there is an urgent need for more thorough organization of the marketing of animal produce, and much of the report is devoted to discussion of methods of ghee production, the successful preparation of hides, and to demonstrational work on the utilization of the indigenous breeds of cattle as dairy cows.

The situation with regard to animal diseases is stated to be unfavourable in comparison with the years 1930 and 1931, and there is an increase in the number of reported outbreaks of the more important diseases. The chief reason for the increased incidence of disease is considered to be unauthorized movement of native-owned stock.

RINDERPEST.—Sixty-five fresh outbreaks are recorded during the year. Introduction of the vaccine plus virus method of immunization constitutes an advance in the methods of control of this disease. The policy of control is, however, in a transitional state since, in addition to the vaccine plus virus method, inactivated vaccine alone is used in certain areas ; while in still other areas, chiefly the agricultural native reserves or settled areas with a heavy population of native squatter stock, the serum-simultaneous method is still practised. It is emphasized that in those settled areas where there are few or no squatters, rinderpest has not been reported, whereas in other districts where squatter cattle are numerous the number of outbreaks has increased. Approximately 50 per cent. of 139,058 double-inoculations were carried out in the Uasin Gishu and Trans Nzoia areas, principally among native squatter stock.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—The position in the settled areas remains satisfactory. In the infected pastoral reserves efforts are being made to obtain more accurate information concerning the distribution of the disease, as a preliminary to an intensive campaign of vaccination in the near future.

EAST COAST FEVER.—Numerous extensions of this disease from enzootic into clean areas are a source of anxiety. It is considered that this unsatisfactory position may be attributed to illicit movement of stock and to neglect, or that a laboratory diagnosis is not always obtained when the first cases occur. Owing to the absence of financial provision the Dipping and Fencing Ordinances could not be made operative during the year.

HAEMORRHAGIC SEPTICAEMIA.—Two outbreaks of this disease occurred during 1932. These are the first cases recorded in the colony. A reference to the diagnosis of this disease is made in the research report [this *Bull.* **4.** 491].

DISEASES OF SHEEP.—Reference is made in the research report to the pneumonias of sheep, Nairobi sheep disease, heartwater, parasitic infestations and contagious pustular dermatitis.

STERILITY.—Much time and work have been devoted to an investigation of various causes of sterility on a broad basis. Slow breeding is a common characteristic of cattle of the indigenous breeds.

RABIES.—An extensive outbreak of rabies caused general public uneasiness in both settled areas and native reserves. The outbreak appeared to spread from the South Kavirondo native reserve northwards, through the Sotik, to the densely

populated Kisumu-Londiani, Molo and Kericho districts. The animals attacked were dogs, jackals and, in certain cases, cattle. Several natives died, and numerous Europeans and natives received prophylactic treatment after being bitten by rabid animals. The outbreak assumed such alarming proportions that an intensive campaign was commenced for the destruction of all uncontrolled dogs and small wild carnivores by poison-baiting. In addition, a close control of movement of dogs from the infected areas was effected by the introduction of a system of licensing movements by road or rail. The position at the end of the year was fairly satisfactory.—R. DAUBNEY.

BOOK REVIEWS.

VON OSTERTAG, R. [Ministerial Director & President, Württemberg Ministry of the Interior, Stuttgart]. (1932). Lehrbuch der Schlachtvieh- und Fleischbeschau einschliesslich der tierärztlichen Lebensmittelkontrolle für Tierärzte und Studierende der Tierheilkunde. **[Text-Book of Slaughter Animals and Meat Inspection, including Veterinary Food Control for Veterinary Surgeons and Students of Veterinary Science].** pp. xix+1208. 358 figs., 5 plates, 15 tables. [Numerous refs.] Stuttgart : Ferdinand Enke. [8vo] [RM.108].

This is an up-to-date and concise text-book of meat inspection by the author of that famous veterinary meat inspector's " *vade mecum*," " Ostertag's Handbook of Meat Inspection." The arrangement of chapters in the new book follows closely that of the old " Handbook," viz., a short introduction, German food laws and a brief summary of the food laws of other countries, food animals, *ante-mortem* inspection, abattoirs and methods of slaughter, including the latest electrical methods, general meat inspection, diseases, emergency slaughtering, meat poisoning, preservation, and much other useful and instructive information covering practically the whole of the meat industry with its numerous ramifications. There is a chapter on fish diseases and inspection. The methods advised for dealing with the various diseases found are written from the German standpoint, but there is now available an English edition of this work [*Infra*]. Copious references are found at the end of every chapter.

The book is well turned out, and the plates are excellent. It is difficult to imagine any German veterinarian without a copy of this most comprehensive and useful publication and von Ostertag is to be congratulated upon once more upholding the reputation of veterinary science as applied to food inspection.

—D. J. ANTHONY.

VON OSTERTAG, R. [Ministerial Director & President, Württemberg Ministry of the Interior, Stuttgart]. (1934). **Text-Book of Meat Inspection (Ante-mortem and Post-mortem) including the Veterinary Control of Meat and Meat Products.** [Edited by T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M., F.R.S.I., late Veterinary Inspector for the City of London. Translated by C. F. MARSHALL, M.Sc., M.D., F.R.C.S.] pp. xi+743. 247 figs., 10 coloured plates, 11 tables, 12 appendices. London : Baillière, Tindall & Cox. [8vo] [£2. 5s.]

This English edition of von Ostertag's latest text-book on meat inspection, edited by Lt.-Col. T. Dunlop Young, and so ably translated by C. F. Marshall, will be welcomed by every veterinary surgeon engaged in meat inspection throughout the English-speaking parts of the world. This edition follows closely the

arrangement of the German one, except for the omission of a chapter dealing with fish inspection. A chapter on poultry inspection has been inserted in its place. The history of meat inspection as well as the German food laws have also been left out of the English edition and, in place of these, an appendix is added giving various meat inspection laws and regulations for home and imported meat. The 1922 memorandum on meat inspection issued by the Ministry of Health is also included.

In his preface the editor asks that any errors be pointed out for future rectification, but so well has the work of editing been done that few can be found. On page 529, in the paragraph dealing with the " smoking " of meats, the duration of the process for the various classes of goods mentioned applies to Germany, in particular for the " Landrauch " meat. In Great Britain it is merely a matter of " days " and not " weeks."

This book should be in the hands of every veterinary surgeon throughout the English-speaking parts of the world, whether he inspects meat or not, as the information it contains covers such a wide and useful field. The author, editor, translator and publishers deserve thanks for filling up a serious gap in English meat-inspection literature. [See also Ostertag–*supra*].—D. J. ANTHONY.

LOGIE, H. B. [M.D., C.M., Executive Secretary, The National Conference on Nomenclature of Disease]. (1933). **A Standard Classified Nomenclature of Disease.** pp. xvii+702. New York : The Commonwealth Fund. [8vo] [15s.]

This classified nomenclature of disease has been compiled by the National Conference on Nomenclature of Disease, which grew out of a conference called by the New York Academy of Medicine on March 22nd, 1928. The primary object is to develop a standard national nomenclature of disease to replace the multiplicity of effort represented by alphabetical lists of disease and elaborate classifications used by hospitals, health organizations, insurance companies and others.

A dual method of classification, topographical and aetiological, is used. Treating first with the body as a whole (System 0), it proceeds through the different anatomical systems from skin (System 1) to organs of special sense (System X). The aetiological basis of classification depends upon the recognition that diseases may be divided into (1) those the cause of which is clearly known, (2) those which can be attributed to some secondary causes and (3) those the cause of which is entirely unknown.

The nomenclature is built up by taking each system, consisting of a series of anatomical sites, and superimposing the causes that may produce disease in these various sites. Where the disease is too diffuse to be allocated to any organ, the site is considered to be the body as a whole (System 0). The known causes are prenatal influences, infection, intoxication and trauma. The secondary causes are disturbances of inervation, static mechanical abnormality, disorders of metabolism or nutrition and new growths.

In an appendix, supplementary lists of symptoms are given as well as unclassifiable terms, but in no instance is any of these terms to be considered a diagnosis.

The numerical system or code system is used throughout. This enables records of diseases of the same organ to fall automatically together and affords a brief description of the disease. The code is, like the system of classification, dual, the first half indicating the site, the second half, after the dash, indicating the aetiological classification. By means of the Y code the undiagnosed diseases are classified according to what is known about them.

Many find the use of the code system troublesome, but the use of the code

numbers is optional and they are supplied mainly for the convenience of large hospitals and other large organizations.

One of the most important parts of the system is the index, which gives reference to every disease whether it be by its commonly preferred title or by some other in current use.

The Nomenclature has been designed primarily for clinicians and the clinical point of view has been allowed to dictate the choice of terms, provided it was not at variance with scientific accuracy or completeness. It will form a valuable reference volume for clinicians, public health officials and record-room clerks. It should do much to counteract loose and inaccurate medical thinking.

Its use in the field of veterinary medicine is limited by the absence of many terms which are not common to it and human medicine.—L. B. Bull.

Becker, E. R. [D.Sc., Associate Prof. Protozoology, Iowa State College]. (1934). **Coccidia and Coccidiosis of Domesticated, Game and Laboratory Animals and of Men.** pp. ix+147. 25 figs., 8 plates, 7 tables. [337 refs.] Ames, Iowa: Collegiate Press, Inc. [8vo].

This monograph is an attempt to bring under one cover the rapidly accumulating knowledge of coccidia and their relation to the host. Reference to the author's list of consulted works gives some conception of the labour which was involved in achieving this and he is to be congratulated on the excellent manner in which he has arranged his material. Owing to the wide and divergent limits of the field, the application of the book is limited. Veterinary clinicians' and pathologists' interest in coccidia is usually centred around one aspect of the problem or one host species and they would, therefore, consult original publications. It is, nevertheless, an invaluable book of reference and can be confidently recommended for study, both to those embarking upon research into any problem related to coccidia and to those who feel that they have failed to keep pace with recent accumulation of literature on the subject.

Twenty pages are devoted to the general aspects of the subject. The section on the life cycle of coccidia contains little that is not dealt with in text-books. Both here and in later chapters, discussion of taxonomy is wisely reduced to a minimum or avoided. The phenomena of host-specificity, effects of the parasites upon the host, immunity, and physiology of oocysts are fully and critically dealt with; most of the information upon these subjects has been drawn from a relatively small number of recent publications, the author's indebtedness to which is acknowledged in the preface. In the section on prophylaxis the reader is presented with a chronicle of measures which are of probable value, but little attempt is made to sift the information. More critical attention is given to it in later chapters devoted to individual hosts. In the section on therapeutics the numerous agents which have been found to be of little or no value are mentioned and measures which have given encouraging results are considered in some detail.

The remaining 89 pages of text are divided into 22 chapters, each dealing with the parasites of one host or of a group of related hosts. It is, of course, inevitable that this part of the book should be in the nature of a review of literature.

There are three appendices. The first is an alphabetical list of vertebrate hosts which are not dealt with in the text, with references to relevant publications; the second is a host-catalogue and the third a very brief account of technique. The book is well illustrated but only one figure and one plate are original. There is a subject and an author index.—R. S. Roberts.